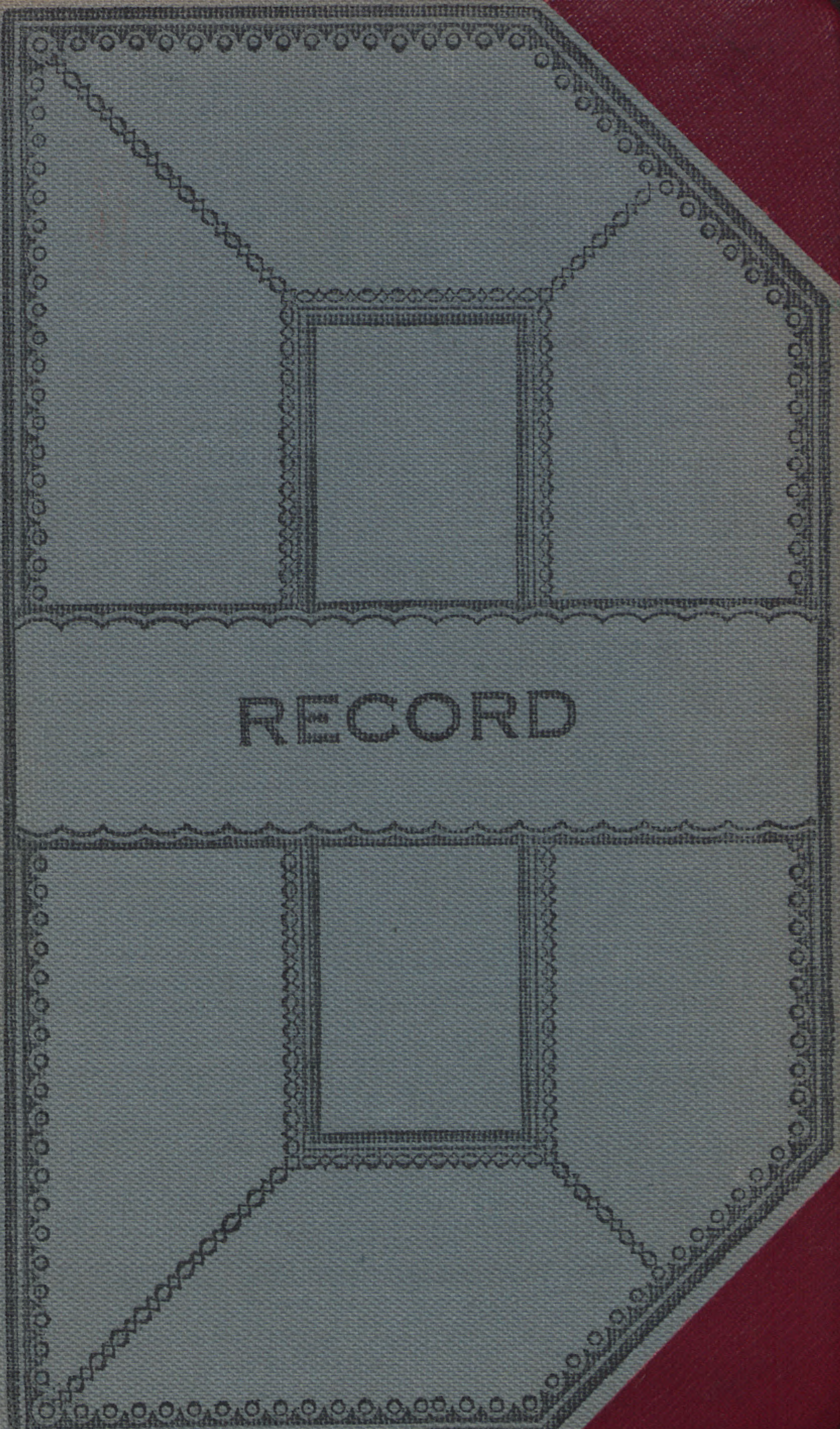

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36925 - 37261

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SHOUT
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F. R. Fosberg

4

Collection and Field Note Book

No. 44

(April 20, 1956 - June 3, 1956)

(36925 - 37261)

MALAYA 1-41
Kuala Lumpur-Seremban road 1-3
Sungai Menlaya Forest Reserve,
Pt. Dickson ...36925-36927.............. 4-10
Road trip Kepong-Frasers Hill (Pahang).... 11-13
Frasers Hill 36928-36940 14-20
Kepong Forest Research Station
36941-39647 22-23
Air trip--Kuala Lumpur-Singapore 24-27
Singapore Island, The Gap..36948-36954a... 30-31
Pandan Nature Reserve.................... 32-35
Singapore Island water catchment area 36-37
Flight Singapore-Bangkok 38-41

THAILAND 42-66
Wang Noi 42-43
Pukae Botanical Garden 36955a 44-46
Bang Djark .... 36955-36955b .. 48-49
Bang Saen .... 36956-36963 ... 54-55
Bang Phra................. 36964-36968 ... 56-47
s. from Bank Phra to Si Ra Cha 58-59
Bangkok 60-61
Flight Bangkok-Hong Kong 62-71
over Viet Nam 67
South China Sea, Hongkong 68-71

RYUKYU ISLANDS
Okinawa 75-105
btwn Naha-Kadena Air Bases 74
btwn Kin-son-Kochiya................... 76
Yaka................................... 75
Buma................................... 77
Yaka..................... 36969-36979.... 78-81
Meiji-yama .... 36980-36988.... 80-83
Shio Gawa (Suga).......... 36989 82-83

Okinawa (continued)
Shushi 36990-36993-36996.82-85
Kami-motogue,Nakajin, Protected Forest,
Nakasoni, Nago, Shuri, Naha, Kiyan.... 84-89
Ozato 90
southern Okinawa 91
Kadena Air Base 92
Ozato 36997-37004 92-93
Kiyan................. 37005-37118 94-97
btwn Awase Meadows-Awase Air Field 96
Enobi .... 37023-37025 ..... 98-99, 96-97
Iha-Nakadomari 100
Bolo Point 37026-37037 100-104
Ishigaki 106-194
Ozato 37038-37049 106-109
Nusukun-Muru 37050-37075 108-113
Moriyama 112-118,122-
Todoroki-gawa,mouth 112-118-127
37076-37091...... 128-131
37092-37096 130-131
37104............ 132-133
37106-37115 134-135
37116-37122..... 136-137
37123-37126..... 138-139-142
37097-37104..... 132-133
YCAT Compound .... 37127-37131..... 138-139
Yarabu-dake................................ 142-143
Banna-dake,Nagura Valley 144-145
Shira-Mizer Gawa 37132-37135 146-148
Nagura Valley .... 37136-37142-45.. 146-148
37188-37218..... 174-179,172-3
Fu Saki............... 37146-37147 150-151
Kabira 37148-37160 158-164,152-3
37219-37223-30... 180-183
~~37231-37231a~~..... ~~182-183~~,178-80
Yoshikara 154-155
Nagura-Gawa mouth..... 37162-37163 166-167,165
Nagura................ 37161............ 166-167
Kabira................ 37163-37187 166-171
Shira Hama 37231-37231a 182-183
Nosoko-Dake 37232-37243 186-189
Todoroki-gawa 37224-37255 190-193
Kara-dake .... 37261 .... 192-193a

44

36925

- 37261

45

37262

- 37726

46

37727

- 38134

47

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1956 Malaya

April 20 – The road from Kuala Lumpur to Seremban is almost entirely through rubber plantations. Many of these are mature, but some are quite young. There is considerable replanting going on. The old trees are poisoned, and when dead, cut for firewood. This accounts for the areas of whitened skeletons seen from the plane on April 18.

The dark green trees in close rows, seen then, are also rubber, planted in "hedge" style, with the trees very close together in rows, or double rows, with wider spaces between the rows. This is supposed to save labor in tapping.

Generally the spacing is so close that the crowns touch all around. The cleanness of cultivation varies in different estates. Formerly clean cultivation was considered best. Now cover crops, weeds, selected weeds, etc. are left on the ground on many estates. An argument for clean cultivation is that weeds or other plants which come as high as the tapping panels seem to encourage fungus attack in these areas.

At this season the trees are in somewhat less than full leaf, making them a rather uneven grayish green. Later they are much darker green, and cast a denser shade.

Planting on steep hills is prohibited unless terracing is undertaken. This is the contouring seen from the plane.

Just before reaching Seremban the road crosses a range of hills which are covered by forest reserve. This is rather nearer hill dipterocarp forest, even though it is at a very low altitude for this. It is an example of the depression of altitudinal zones seen in coastal and isolated mountains and hills. It has been rather degraded by logging. A scattering of Shorea curtisii is visible marked by ~~because of~~ a gray color, from a distance.

Scattered here and there in low spots all the way to Seremban are clumps and small patches of Metroxylon. Whether this indicates swamp is not always obvious. It may be used principally for thatch, though the sago also is used, at least locally.

Between Seremban and Port Dickson again rubber estates predominate. On a low range of hills there is young forest, very tangled, perhaps up to 10 m. high. This was cleared by the Japanese during the war. It has grown up to "belukar" or second-growth but with a good crop of dipterocarp seedlings nursed by the secondary vegetation. Several miles north of Port Dickson mangroves appear in low spots. Otherwise low places are occupied by rice, or if not too low, by rubber, which seems to do well on low flat rather poorly drained soil.

1956 Malaya

April 20 – Sungai Menyala Forest Reserve, 6 mi. southeast of Port Dickson

OK

Primary rain forest, lowland dipterocarp type, on low flat ground

36925 Carinta
4
common locally in

1 26 Carinta
common locally in

3 27 Ixora
common in openings in

A sample plot in this reserve seems to be partly, at least, virgin lowland dipterocarp forest. The trees over 4" dbh. have been enumerated, numbered, and identified.

Rainfall at Port Dickson 80-90"; well distributed.

The ground is flat, with no marked irregularity. The soil is a yellowish gray brown at the surface, ~~of~~ feels like a fine silt with a little fine sand. Surface covered by a thin, rather continuous litter of dead leaves. No marked

---

Negri Sembilan

Center Caps

5 m I

prostrate, extensively creeping herb; peduncles erect; fruit black, glossy, fleshy.

fruiting stems erect from creeping rhizome; fruits purple-black, glossy.

shrub 1-2.5 m. tall; flowers deep orange, on red panicles.
"bunga siantan"

darkening by humus. It is apparently fairly deep.

This forest has an irregular canopy, in places dense, in places rather open, about 30-35 m. high. Taller trees are in groups, reaching considerably taller.

The canopy trees are from 3-5 dm. dbh., the emergents larger, about 1 m., are enormous Shorea parvifolia seen 15+ ~~[illegible]~~ dm. diam above buttresses. at its base was a huge mound of earth about 1.5 m. high around and between the buttresses. This turned out to be a termite nest. Most of the large trees here are buttressed.

Big trees
Koompassia
Shorea leprosula
Shorea acuminata
Shorea parvifolia
Dipterocarpus crinitus
Dipterocarpus verrucosus

An irregular second story seems to be about 20 m., of trees 1-2 dm. dbh.

A definite shrub layer, 2-5 m. high, stems about 0.5-1 m. apart, easy to walk through; ~~a few~~ young rattans, mostly still in rosette stage, rather common. Melastomaceae common also Ixora.

Locally there is a sparse but very definite ground layer of Carinta (2 spp.), a few ferns, and seedlings of various trees. These latter may persist in a dormant stage a few dm. tall or less, for a number of years, shooting up if an opening occurs to let in light.

In a small opening, at least 10 years old, were saplings of dipterocarps from 3 to 6 m. tall, but

rather few of them. Also Ixora, and a big Sansevieria. This was essentially still an opening, after 10 years, with the ground between the bushes quite bare. In an opening caused by fall of a large tree, more recently, there were also a few fairly large saplings, many smaller ones; some Ipomoea and other weedy things.

Lianes are not especially abundant here but are sometimes very large, one seen 15-20 cm. diam.

After these forests are logged out, the remaining trees are frill-girdled and then poisoned with sodium arsenite. It takes them up to 1 year, or even 18 months, to die, and one ~~[illegible] to rot~~ to five years to rot and fall down. The tangle of climbers and saplings which follows is open beneath in 3-5 years, and may be from 10-12 m. high.

1956 Malaya

April 20 — About 6 miles southeast of Port Dickson, along coast road.

Along the inner edge of the mangrove swamp coconuts have been planted, even a hundred yards or more out into the mangroves. ~~which~~ There has been an attempt to drain the swamp by ditching. The coconuts look very sick, with small crowns of yellow leaves. In the swamp, here, are bushes of Lumnitzera littorea 1-1.5 m. tall, and Pluchea indica, small clumps of Acrostichum aureum, patches of Ischaemum and a fine wiry grass, possibly a form of Sporobolus virginicus.

Nearer to the sea, a mile or less along the road south, where the swamp is better developed, the trees larger, Lumnitzera, Avicennia and Rhizophora make up the vegetation. The trees here are to 5 m. tall. Large spaces between, irregular, are filled with steep conical mounds of

Negri Sembilan

dried mud to 5-6 dm. high, each with a hole in the top. They are said to be made by crabs.

Examined beach and rock along coast 5 miles south of Port Dickson. The beach is of fine quartz sand. Casuarina trees are common. Scaevola sericea locally forms a strip to 2 m. high, with some Ximenia americana. Ischaemum muticum, Sporobolus virginicus, and Ipomoea brasiliensis are common along the beach.

On the rocks, which are like a thick lateritic iron pan (see sample), there are thickets of Hibiscus tiliaceus, also Eugenia sp. On bare spots Gleichenia linearis comes down to within a few feet of high tide mark.

Some of the same rock forms a reef a few meters out from the beach.

This is said to be the only place where there is sandy

1956 Malaya – Negri Sembilan

beach along this whole coast. It is a rather poor narrow beach.

In intervals in the beach there is a strip of mangroves. Here the outer belt is mainly Sonneratia, which actually grows out in the shallow water on sand bottom. The Sonneratia is tall and spirelike and lighter colored than ordinary mangrove, and does not look exactly right from the air. Probably the outer belt seen from the air in Johore was Sonneratia rather than Casuarina.

Selangor

April 21 – trip by road from Kepong to Frasers Hill.

From Kepong to where the road branches off to follow up the Selangor River valley into the mountains is almost solid rubber plantation, with an occasional small patch of belukar.

In the river valley the steep walls are covered by a mixed forest, doubtless lowland dipterocarp forest at the base, changing to hill dipterocarp farther up.

In the valley bottom is belukar with a great ~~deal~~ of a slender bamboo. Small rubber plantations are scattered here and there where the land is reasonably level. The lower slopes are also belukar with bamboo. A small tree, Pentaspadon officinalis, is communally flowering in the belukar.

At milepost 47 good hill dipterocarp forest may be seen across the valley where the ridges are well marked by the gray crowns of Shorea ~~leprosula~~ curtisii, mixed with the yellowish ones of Shorea leprosula.

Going upward the belukar has more and more primary forest trees in it. Steep banks and cuts are covered by Blechnum orientale, Gleichenia, shrubs, vines, etc.

Upward, the forest near the road is very uneven. Big trees have been removed and there is much bamboo and tangled growth.

Near 2050' altitude the forest is less degraded. Large trees are mostly dipterocarps but there are some beautiful Koompassia.

Shorea platyclados has a beautiful straight trunk and hemispherical crown.

From here up to 2800' hill dipterocarp forest is well developed. A beautiful arching bamboo with broad leaves fills the spaces where trees have been removed and the clearings. There are some rattans and tree ferns. Ferns are more abundant upward.

At the gap, 2800', and for some hundred feet higher there is still hill dipterocarp forest. Tree ferns are common.

Upward the forest is dense, with less bamboo. It is very mixed, stature seems a bit lower, climbers are more abundant.

The tree ferns seem to be more in ravines and in old disturbed places. Dipteris is common on cuts and slides, as well as Blechnum and Gleichenia. Other Gleichenias than linearis are coming in.

As milepost 61 is passed the forest takes on more and more the character of montane rainforest, but there still are plenty of dipterocarps. It has been much disturbed. By milepost 62 we are in montane forest.

There are landslides on steep slopes, covered by Gleichenia. Ferns generally, are now very conspicuous, as well as all kinds of epiphytes.

1956 Malaya.

April 21 - Frasers Hill.
ok Montane rain forest on ridge

36928 Nephrolepis
1 occasional on stumps and fallen logs

1 29 Cephaelis
rare

1 30 grass
common along trail

1 31 Hymenophyllum?
on tree trunk

3 32 Saurauia
rare in

1 33 Freycinetia?
common in

34 moss
in deep moss beside trail

2 35 Mussaenda
in undergrowth

1 36 Panicum
rare along trail

3 37 Chloranthus
occasional in

1 38 Psychotria?
rare in

1 39 Ardisia
rare in

Pahang
center, Caps

1300-1400 m

shrub 1 m. tall; flowers
— cream white.
erect, single stems
or several together.

~~large shrub~~ a small tree, 5 m. tall;
flower clusters on trunks; buds red, outer sepals pink, inner ones white with pink midrib,
— petals white, recurved.
climbing; fruit immature.

fruit secund, crimson.

climber, twining in shrubs, enlarged calyx lobe ~~[illegible]~~ white only on central flower of cymule, corolla bright yellow; hair on petioles maroon.
cymule

shrub 2 m. tall; ripe
— fruit yellow.
shrub 1 m. tall; buds
— white, slightly purplish.
slender, sparsely branched shrub 1 m. tall; fruit crimson.

1956 Malaya

36940 Joinvillea elegans
3 common in openings and along trail

Fraser's Hill is a rather recent ~~so~~ resort settlement with many winding roads and bungalows, situated on the main crest of the mountains, between Pahang and Selangor, at somewhat over 4000 feet.

There is much planting of ornamentals, pines, araucarias, Eucalyptus, etc. around the settlement. Cleared areas, where not in lawn or garden, are occupied by a lush tangle of ferns – Gleichenia, Athyrium, etc., Joinvillea, a reed that looks like Phragmites, bushes, etc.

The ridge forest varies considerably in stature, in some exposed places as low as 10 m., mostly 20–30 m. The trees seem to be of all heights, with no distinct layering evident, except a ~~[illegible]~~ shrub layer and a herb layer.

caespitose, canes up to 4 m. tall; ripe fruit deep orange red.

Light is cut off very effectively by the trees so that little if any direct sunlight hits the ground. Tree genera seen ~~so~~ and recognized on the ridges were Weinmannia (Blumei?), Podocarpus, Quercus, Castanopsis, Pithecellobium, Eugenia, Cyathea, Caryota. In a group of especially tall trees on a low part of the ridge were Bucklandia (or is Symingtonia correct name?), Litsea, Cinnamomum (cinereum?), and Calophyllum.

Epiphytes are abundant on the trees, as well as creepers, especially those that cling close to the bark. Of epiphytes bryophytes, orchids, ferns, incl. filmy ferns, lichens are most common, though Ficus and such, which eventually reach the ground, are common enough. Drynaria and Asplenium nidus are conspicuous. Large ant tubercles, probably from Drynaria, are seen fallen on the ground.

The shrub layer is rather dense, 2-4 m. high and too thick to walk through without cutting. In it are many melastomes, a large Athyrium, many rattans, an abundant semi-climbing palm—Areca or Pinanga, and a small fan palm, as well as Freycinetia, Pandanus (rare), Amomum and other zingiberaceae, Chloranthus, Glochidion, Mussaenda (climbing), and several other small Rubiaceae.

There is a distinct herb layer of ferns, Selaginella, Elatostemma, gesneriads (incl. Didymocarpus spp.), ~~and~~ melastomes (?), and abundant mosses, incl. a very large dark green one.

The soil has an accumulation of several inches of raw humus, overlying a fine gray-brown silty or clay soil. The weathering is apparently fairly deep.

In low gaps and in ravines the epiphytes are more luxuriant. The undergrowth, also is more abundant, and includes a greater abundance of small palms and zingiberaceae, as well as a slender Musa. Leaf epiphytes are conspicuous, as is Asplenium nidus.

On steep parts of the ridge an elongate climbing bamboo becomes very common. On level parts toward Pine Tree Hill the trees are tall, about 30-35 m. and the canopy is denser. The undergrowth is correspondingly sparser and more open.

On slopes (45°-75°) on sides of ridges the trees are tall, 30 m. or more, there is no sign of definite layering above the shrub layer, which is denser than on ridges. The canopy is rather uneven. Ferns and rattans are abundant in shrub layer. Epiphytes and herbs are abundant. Principal trees seen are Quercus, Canarium, Eugenia, Xerospermum, Barringtonia, Beilschmiedia, Phoebe, Calophyllum, Litsea, Parinari, Vatica, etc. Several species of Pandanus, Amomum, Cyathea, palms, etc. in undergrowth. Smilax and other climbers abundant. Mosses and filmy ferns are conspicuous.

1956 Malaya

C.R. April 22 – Kepong Forest Research Station

36941 Melastoma malabathricum
bushy roadside

1 42 verb.
common on bushy roadsides
and in young plantings of trees

1 43 Cyperus
occasional on grassy roadside.

2 44 Selaginella
common in second growth

1 45 Axonopus compressus
very common in grassy
places and on trails.

1 46 Upuna borneensis
[illegible] planted in arboretum

1 47 Shorea acuminata Dyer
planted in arboretum

Selangor Cuter Coffs

get alt from
air chart

shrub 2 m. tall, flowers
rose pink, filaments
curved.

small tree 4 m. tall,
flowers greenish and
violet, filaments
long, curved, white.
roots fragrant.

climbing

young tree 6-8 m. tall.

tall tree 25 m. tall,
fruits and leaves picked
up from ground beneath.
Gum exuded from scars
on trunk, hardened.

1956 Malaya

April 22 - Air trip from Kuala Lumpur to Singapore (straight from Kuala Lumpur to Malacca, then along coast.) (from southwest side of plane).

The outwash from the tin mines is white sand, the actual mines are varicolored, from red to brown, yellow, white. There are many ponds, some of them very green. The white sand is in places largely revegetated.

In the tin area near Kuala Lumpur some of the hills are covered by lalang (Imperata), others by Gleichenia. The two are nearly the same green, but lalang is somewhat lighter, Gleichenia brighter.

Southeast of Kuala Lumpur is mostly in rubber plantations. Much of this is in hedge style planting, either in straight rows or maze-like. The country is hilly but mostly in rubber except a few lalang patches and a very little forest along several closely meandering rivers. The lobes into the

meanders are grassy, the part back of the grass is wooded; as well as the concave sides. Rubber on both sides.

Young rubber is generally deep green and with a closely tessellated pattern or texture. The older rubber is grayish green at this season and has a much less well defined texture.

Southeastward are some higher hills with forest (definitely darker green than rubber and mixed spotting of different greens) and patches of bright green lalang.

In valleys to southwest brownish rice land forms dendritic strips.

Some tin mining on rivers southeast of these hills. Rubber between these rivers. The rivers are a café-au-lait color.

As we get nearer the coast ~~at~~ the hills are lower and all in rubber but a few forests just inland from an odd-shaped finger-like cape. South of this is a conspicuous estuary

1956 Malaya

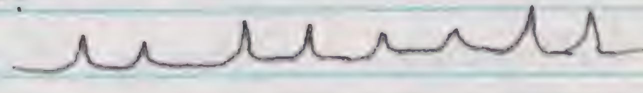
with a rather broad area of mangrove extending well inland. Here are some patches of forest, and some brushy fern land, much new rubber plantation contour terraced. There are less plantations than in most places, especially less mature ones. Some rice-land in dendritic strips – dirt color at this season. Southward are many newly terraced patches, bare and pinkish white.

Rice becomes dominant southward and nearer the coast, around Malacca; and south of it, in a definite narrow band behind a narrow mangrove belt. A few tiny sandy beaches either red or white, a bit south of Malacca.

One hour south of Kuala Lumpur – 3 large canals cut from inland to the sea – for drainage?

In the large bay north of the last headland before Johore Strait are curious cuspate points projecting out at right angles to the

mangrove shore. Points are apparently of mangroves. Thus:



How can be explained features like Johore Strait, of which there are several also on the northeast coast of Sumatra and the east coast of ~~the~~ Borneo. They are narrow arcuate channels cutting bite-like islands out of the coast.

1956 Malaya

April 23 - Singapore Island
The Gap

A small hill, beside The Gap, may be considered typical of a considerable amount of land on the sedimentary hills of Singapore. It is of sandstone, with the soil completely eroded off of the upper parts, except for what is held in pockets, and that is filled with broken rock and bits of ironstone (indicating that the soil, before the erosion, was severely laterized?). Lower slopes with deeper soil, but very deeply gullied.

On the slopes the principal plants are: Adenandra sp.
Gleichenia linearis
(grass or Schoenus)
Gahnia sp.
Dillenia suffruticosa
Lycopodium cernuum
Ficus alba
Myrica sp.
Fagraea fragrans (small sapling)
Lauraceae
Rhodamnia
Nepenthes sp.
Bromheadia? (orchid)
Clerodendrum sp.

The vegetation is of very

low stature, to 2 m. tall, varying from sparse, bare ground, even, to closed and grassy or scrubby.

The top of the hill affords slightly more favorable conditions, with a small relatively flat area. Here are
Melastoma malabathricum
Ischaemum sp.
Imperata cylindrica
Blechnum orientale
Cordia cylindrostachya
Sporobolus (large, elongata-like)
Digitaria violacea
Chrysopogon aciculatus
Cyperus sp.
Borreria sp.
in addition to the plants found on the slopes. Dillenia and Ficus form low thickets, 2 m. or so high.

1956 Malaya

3 of each
DR

April 23 - The Gap
eroded land with sparse grass and shrubs on sandstone.

36948 Melastoma malabathricum
~~shrub~~, at base of hill

49 grass?
very common even on most eroded places

50 Clerodendrum
occasional

51 Ficus alba
occasional in scrubby spots.

52~~[illegible]~~ Adenandria
common

DR
April 23 - ~~[illegible]~~ Pandan (?.) Reserve
Mangrove swamp

53 Avicennia officinalis
common in interior of swamp

54 Pavetta
rare in interior of swamp

54a Dischidia rafflesiana
rare epiphyte, on Lumnitzera near inner margin of swamp

(1) 53a Dalbergia candenatensis Prain = D. torta Grah.
~~scandent~~ edge of mangrove swamp

April 23 - The Gap

52a Nepenthes
on badly eroded slopes of sandstone with scattered shrubs and sparse grass

---

Singapore Center Caps

40-70 m.

shrub

tufted

shrub 1-1.5 m. tall.

shrub 2 m. tall, leaves variable in outline.

shrub 1.5 m. tall.

0 m.

small tree, flowers yellow.

woody scrambler; flowers white.

~~P~~ creeper, pitchers laterally compressed, inhabited by small ants.

det. H.M. Burkill — scandent

65 m.

1956 Malaya

April 23 – ~~Cannon~~ Pandan (?) Nature Reserve –

"wet mangrove swamp"

This is a rather extensive area of mangrove of rather low stature. The substratum is mud, which in even small openings, is built up into steep conical mounds with holes at the top, said to be built by fiddler crabs. These would protrude above most high tides. And very few of them have any plants growing on them, occasionally a young Acrostichum.

The principal trees here are Avicennia officinalis, Bruguiera sp. (small fld. like Malabar sp.) Rhizophora apiculata (?), R. mucronata, with Scyphiphora hydrophyllacea and Acrostichum common enough. Lumnitzera and Bruguiera only seen toward inner margin of swamp, the Bruguiera very rare. Dischidia rafflesiana seen only on Lumnitzera.

Along road across swamp many more plants are to be seen. These are on ground covered by salt water at highest spring tides. Those seen were:

Hibiscus tiliaceus
Morinda citrifolia

Acanthus ilicifolius?
Randia sp.
Allophyllus sp.
Lygodium scandens (?)
Derris trifoliata
Pavetta sp.
Glochidion (or Pflueggia) sp.
Excoecaria agallocha
Dalbergia (vine)
Wedelia biflora
Eleusine indica
Cyperus sp.
Scleria sp.
Melastoma malabathricum
Nephrolepis biserrata
Dillenia suffruticosa
Ipomoea pes-caprae ssp. brasiliensis.
Flagellaria indica

From boat along north side of estuary the swamp is rather uniform, the trees back from the edge reaching ± 10-12 m., much lower along edge. This stand is 20 or more years old. The plants seen are

a Rhizophora apiculata
o R. mucronata
c Avicennia officinalis
l Sonneratia sp. (only toward head of estuary)
o Scyphiphora hydrophyllacea
o Bruguiera (small fl.)
a Nypa fruticans

1956 Malaya

The top of the canopy here is very uneven. The stilt roots of both species of ~~Rh~~ Rhizophora generally originate 1.5 m. or less ~~from~~ above base of tree, but occasionally 2 m. or higher, even coming down from branches. The roots may arch secondarily twice or more times, branching each time.

On the south side of the estuary the stand is of more even height, though varying from place to place from 3 to 8 m. Some doubt if this was cut during war, but may have been, at least in places.

On this side Scyphiphora is more common. There is also more ~~so~~ bare soil exposed at low & mid tide. Rhizophora mucronata is more common here, but occurs as single trees. The leaves of this are broadly elliptic, broadly acute, almost obtuse, the cymes 4-flowered, drooping. The radicle up to 0.5 m. long. The roots on this rarely originate from as high as 2 m.

The other species, commonly called R. conjugata (but incorrectly acc. Merrill) has narrower and smaller leaves, very slightly accuminate (looks a little like Bruguiera conjugata). Its inflorescences are here uniformly 2-flowered, stiffly divaricate from stems, very short. The radicle (scarcely any seen at this season) only 10-20 cm. long.

Inland from swamp are ponds for culture of prawns. The mounds built by fiddler crabs are conspicuous in these.

April 23. Water catchment area —

Mostly "belukar" or secondary growth, in fairly advanced condition. A thick stand of ~~poles~~ pole-sized trees, about 15 m. tall, to 10 cm. dbh., including Ficus spp., Symplocos, Oxymitra, etc. Undergrowth rather thin locally, with a few rattans. Borders are lined with luxuriant Gleichenia linearis.

Several small areas of swamp forest.

In one the peat is over 1 m. deep in center — is really a muck rather than peat. At this season mostly firm enough to walk on, usually has standing water.

General height of trees about 20 m., a few large emergents. Trees mostly small, canopy uneven. Palms, Zalaka and Oncosperma, common. Little undergrowth, some Homalomena on ground but sparse and irregular

Another larger patch has trees irregular in size, but a full canopy at about 20 m., some trees to 30 m. or more.

There is rather thick undergrowth up to 4-5 m. tall, with many rattans and some Freycinetia, many shrubs and vines. Very tangled ~~under~~ ~~some~~ both thin and dense places in canopy. Trees generally buttressed. Stilt roots common, even on shrubs. Some Zalaka and Oncosperma.

Ferns common, both as ground and epiphytic. Many epiphyllous bryophytes.

Ground a deep soft muck, with a little standing water in places. Cryptocoryne common in spots where undergrowth not too dense.

1956 Malaya

April 24 - Flight Singapore to Bangkok.

Areas of low mangrove around east end of Strait of Johore, with winding tidal streams around inlets, suggesting a drowned coastline. All higher ground seems to be in rubber plantations except a cluster of low hills which has grassy ridges and thickets in the ravines.

North of this a short distance the country is low hilly and solidly forested. These hills have large emergent trees, the low places between them have a very smooth canopy. possibly swamp.

Northward mostly cloudy. As coast is approached the country is forested, but with many patches of belukar.

Just back of the coast the streams meander intricately in what must be swamp forest. They are not at all muddy but very dark. Coast has sandy beach, the sea is blue, not at all muddy.

There are many small clearings immediately along beaches. Crossing the bulge of the east coast streams trend east through low forested country, meandering with many oxbows. They are very muddy. Along the streams are many clearings and patches of belukar. The hilly country to the north is densely wooded, with a few clearings at first, then as it gets rougher, none at all, but dense virgin forest, with emergent trees clearly visible from 16,500'. Then, low hilly country with muddy streams trending eastward. Many clearings along larger streams. Landslide scars clearly seen. Abundant cumulus clouds. Large river leaving hills, enters lowland and starts to meander. Along meandering part is extensive clearing - running up to foothills even far away from river. A little shifting cultivation along river in hills. The lowland here is very largely cleared or in belukar or rubber. It is hard to distinguish the rubber with certainty from 10500'. Considerable patchwork in lowland and on low hills, shifting cultivation on somewhat higher hills.

As coast is approached again, mostly forest, little clearing except on immediate coast near Trengganu and back from it northward. North of Trengganu is an extensive system of old beaches and dune lines, ponds back of present beach, and a meandering river trending along the coast back of the dunes in a swamp forest. Long lines of sand with sparse scrub and thin lines of woods or brush. (This is opposite ~~Kot~~ Pulau Redang and the islets northwest of it.)

April 24 - Approaching Thailand from south - islands and headlands on east side of Gulf of Siam - much cleared land in lowlands, hills largely wooded, but poor looking woods. Rock showing through on islands. Bays to east are lined by reddish beaches. Some red erosion scars inland in lowlands. Islands are high, not especially rough, shores

of reddish rock with white beaches. Islands are not or scarcely cultivated, at least on west sides. Smallest of them are completely denuded, or almost so.

Sea at head of gulf very muddy, much very low mangrove along coast, cut into by rectangular patches [salt farms]. Then a strip of solid cultivation - open fields. Then a strip that appears to be mangrove, also along big river estuaries, but this is really thickly settled land with miscellaneous cultivation - coconuts, bananas, etc. Many trees. Strips of houses with abundant trees along watercourses, many small isolated patches, too. All else rice fields - brown now.

Driving to Bangkok from airport - rice fields, home sites surrounded by bamboo clumps and trees. Along road are canals filled with Eichhornia, Pistia, Polygonum, and other water plants.

Bangkok a very open city, with considerable ground in gardens and trees; only locally congested.

1956 Thailand

April 27 - Wang Noi

Market - fruits & vegetables for sale:

mangoes
pineapples
~~Bactrea~~ Baccaurea sapida
Sandoricum indicum
bananas
Curcuma sessilis & parviflora
Neptunia oleracea
Coccinea indica
Spondias pinnata
Acacia ~~insulaii~~ insuavis
Cucurbita moschata
Jak fruit

This whole area, from Bangkok to the Rapipat canal is perfectly flat low-lying rice land, flooded every year. Houses and villages are like islands, marked by abundant clumps of bamboo, and by trees — mango, Elaeocarpus and Combretum quadrangulare. The fields are separated by low dykes. Have been lying fallow, or just being plowed. Soil dark, brownish gray. The dark layer is in places, only a few inches deep, over a tan colored subsoil. In other spots it is considerably deeper.

~~East~~ North of the Rapipat canal, about Saraburi, the land changes abruptly. It is slightly higher and not flooded, though equally flat. The soil is very pale - the surface cream color, somewhat darker café au lait below. It is watered only by rain. The fields are separated by high well kept dykes of mud. Much more labor is involved in producing rice here. The soil is more sterile. Scattered abundantly over the landscape are trees, & tiny clumps of trees, or bamboo, said to be left for shade ~~also~~ for workers in the fields. The base of each clump has a mound of soil up to 1.5 m. high, light gray-brown, built up by termites. Several species of trees are found here, and a number of herbs and shrubs. These mounds are scattered over the landscape, spaced from 50 m. to 200 m. apart, giving the entire landscape from the canal to the foot of the hills near Pukae Garden, a strange character. More frequent toward foot of hills.

April 27 - Pukae Botanical Garden

a black silt soil, comparable to the black cotton soils of India. When moist is very plastic and stiff. According to test of colloid content by Cenco wilde testing but has a colloid value of 10 - called a loamy sand. However, texturally it would be certainly a silty clay or silt. There is no sand, whatever, but the colloid content is exceedingly low.

The natural forest on this soil was dry evergreen forest, with Dipterocarpus alatus, Eretia, Anogeissus acuminata, Trewia nudiflora, ~~It is ot~~ Homalium, Alangium, Bischoffia javanica. None of this forest left here now. It is an aluvial plain at the foot of limestone mountains. Much of the garden is in low secondary thicket with scattered trees, much of this has been cleared except the trees, which are perhaps 10-30 m. apart, some large near the river (a canal), lower farther away.

~~East~~ North of Pukae and extending southeastward is a range of high limestone hills and buttes. They are of a bluish massive limestone. Their sides tend to be steep to vertical with talus slopes at base. This limestone possibly is the parent material of the black soils to the west, even though these overlie sandstone. They seem to be on silt plains, the silt of which may, at least in part, come from here.

The slopes of these hills are thinly wooded, except on vertical faces, which are mostly bare, especially on the west and southwest sides. This wood is burned over annually, for no apparent reason except carelessness and using fire to scare out deer. The result is that the vegetation is less well developed than it would otherwise be.

1956 Thailand

The branch road to Ayutthaya runs through vast rice fields, in places thickly strewn with houses, in others without a house or even a bush for miles. The houses, as usual, are surrounded by ~~a~~ clumps of bamboo or by a veritable thicket hedge of it. The hedge bamboo is said to be spiny.

As the river is approached near Ayutthaya, thickets become numerous and extensive alternating with rice fields and houses. Ruins of masonry structures become more and more frequent, half covered by thicket. The old capital, at Ayutthaya, was destroyed by the Burmese about 200 years ago. There is still much settlement here, especially along the river, but not much city is yet evident.

April 27 - Pukae Botanical Garden

36995a Dipterocarpus

1

1956 Thailand

ok Apr. 29 - Bang ~~Ch~~ Djark, just southeast of Bangkok.
Along tidal channels between rice fields and road.

36955a Sonneratia acida
3 common

3 556 Emilia sonchifolia
local on railroad embankment

ok with Acanthus ebracteatus, etc.

tree 10 m. tall, flowers with narrow deep purple petals, white stamens.

flowers light purple

1956 Thailand

Along road east are flats covered by a grass, possibly Paspalum vaginatum with Pluchea indica, Acrostichum, etc. Farther on replaced by Suaeda maritima and Sesuvium with Paspalum.

Further east are Avicennia flats, a pure stand, but kept very low, 1-3 m., by continued cutting, even of small sticks for firewood.

This road runs eastward parallel to the coast. eastward the mangrove becomes more diversified, with patches and single plants of Rhizophora, and other mangrove species, areas of Nypa and of Acrostichum. The general background is usually Avicennia, perhaps 2 species. The Rhizophora appears to be R. apiculata or something similar, some R. mucronata locally. The trees seem not to reach more than 5-7 m. Probably they are always cut before they get any larger.

Near the Bang Pa Kong River Some Excoecaria is to be seen, but Avicennia is found also in pure stands again. For one km. or so on each side of the river the vegetation seems to be dominantly in patches a low tangle of Derris trifolia and some Acrostichum. ~~and~~ with considerable mangrove and large areas of Nypa swamp.

Southward toward Cholburi there is some slightly higher ground, with mixed cultivation, alternating with mangrove swamp.

All the way east from somewhat south of Bangkok the road seems to be a sort of boundary between the saline tidal influence and fresh water rice fields. A large canal runs landward of the road - excavated to provide the earth for the road fill.

Between Samud Prakarn and Bang Pa Kong, on the seaward side of the road are extensive "salt farms" - evaporating beds cleared from the mangrove. These are only used during the dry season.

Toward Bang Pa Kong there are, again, some Suaeda flats on both sides of the road. The Suaeda varies, from plant to plant, from a bluish or grayish green to a reddish purple.

There are also flats of Sesuvium and of Paspalum. The Sesuvium is somewhat different from that in the Pacific. Leaves are dull and flattened, stems not conspicuously red, flowers pinky. Mainly miscellaneous cultivation.

The area from Cholburi to Bangsaen is varied, from low marshy or swampy areas to dry land and even a few small hills. Coconuts are planted generally on higher ground and attempts are being made to plant them on ridges piled up in the swamps and marshes. Tapioca is generally grown on

ground slightly higher than the marsh, rice in marshy land that is not too salty. Coconuts and Borassus abundant.

Near Bangsaen is a small area that is in rice and other cultivation, but has scattered clumps of shrubs or trees, a bamboo, with huge mounds of earth, probably termite mounds. many Borassus, in rows and clumps.

some Borassus

At Bangsaen is a sandy flat, quite broad, with many weeds, especially Tridax procumbens and several wiry sedges. Here are Ipomoea pes-caprae, Vitex ovata, Vigna(?) sp. Tribulus cistoides. In low spots Saccharum spontaneum, a very slender variety.

An isolated hill of quartzite has on its seaward side thickets predominately of a spiny bamboo. On the other side a dense tangle of shrubs, small trees, and vines. On ridge a scrubby forest, esp. Ficus aff. ~~[illegible]~~ religiosa.

1956 Thailand

April 29-30, Bang saen
sand flat back of
beach

2 36956 Ipomoea pes-caprae
common
1 57 Boerhavia
very common
2 58 Saccharum spontaneum L.
very local
1 59 Boerhavia diffusa
uncommon
~~2 60 Ficus aff. religiosa~~
~~common~~
3 60 Vitex
common

2 61 Euphorbia
occasional

April 29 Bang saen, ~~Kkao~~ Khao Sammuk
hill of quartzite
3 62 Boerhavia
abundant along road and on talus
2 63 Ficus aff. religiosa
common on

---

1 m.

prostrate, flowers bright
purple.
leafy stem prostrate, inflorescence
ascending; flowers red.
forming dense brake 2 m. tall

prostrate, flowers pink.

prostrate with erect
flowering stems, extensive;
flowers violet outside, paler
within.
stems ascending, somewhat
arched,

10 m

prostrate, inflorescence
ascending; leaves white beneath.
small tree, roots running
down over rocks; ripe fruit purple.

1956 Thailand Phra

April 30 Bang Phra

Sandy flat back of beach, with small ponds and mangrove swamps.

36964 Ceriops
1 very common in small mangrove swamps.

1 65 Borreria
occasional on sand

1 66 Avicennia
common in small mangrove swamps

2 67 Ipomoea pes-caprae
common on sand flat

2 68 Fimbristylis
common on sand flat

bush 1 m. tall.

prostrate; ~~flowers~~ corolla white, tube slender.

shrub 1 m. tall; flowers orange.

prostrate, extensive; seeds on ground.

caespitose, leaves stiff.

1956 Thailand

April 30 - South from Bang Phra to Si Racha vegetation gets more luxuriant. Small hills are wooded but ~~at~~ woods seem very degraded and showing evidence of shifting cultivation on slopes. In flat land ~~[illegible]~~ back of ~~[illegible]~~ beach Manihot is extensively cultivated. Jak fruit trees common.

South of Si Racha wooded hills, flat land ~~between~~ them with much mango, Thyrsostachys, jak, bananas, tapioca. Shifting cultivation "lun loi", and tangled second growth on hills. Second growth called "~~Pa~~a rang" "pah rang". ~~Primary forest~~

From 6 (-10) km. north of ~~[illegible]~~ Bang Lamung are scattered large Dipterocarpus trees on rolling land just back of coast and at a few m. elevation. These left from clearing of forest.

miscellaneous cultivation and large patches of low secondary scrub. various ages. Coconuts, tapioca, rice, bananas jak kapok, mangoes, papaya. South of Bang Lamung dipterocarps become scarce and ~~disappear~~ local. Coconuts most common. A very few Borassus.

Common roadside weeds are Imperata, Eupatorium odoratum, Tridax, Boerhaavia. locally ~~[illegible]~~ Jatropha gossypifolia!

Patya Bay

Low bluffs of porous ironstone overlying a coarse granite. Thickets of Xylocarpus, Clerodendrum inerme, Wedelia biflora, several shrubs. Beach of light gray sand.

1950 Thailand

April 30 – Bangkok is characterized by ~~the~~ an abundance of canals, now mostly in disuse. These have a profusion of water plants, which are gathered and utilized to some extent for pig- and chicken-feed. The following were noticed, but the list is by no means exhaustive:

Eichhornia crassipes
Marsilea sp.
Polygonum tomentosum
Nymphaea lotus
Nelumbo nucifera
Lemna sp.
Pistia stratiotes
Azolla sp.
Cyperus sp.
Commelina diffusa
Alternanthera repens
Victoria regia

Bangkok is not especially noted for its cultivated plants. Many of the common tropical ones are present, but one is not especially impressed by them. These ~~[illegible]~~ are prominent:

Delonix regia
Mangifera indica
Musa spp.
Cocos nucifera
Casuarina equisetifolia
Samanea saman
Hibiscus hybrids
Elaeocarpus sp.
Polyscias spp.

1954 Thailand

course at start 70°

May 1 – Flight from Bangkok to Hong Kong

Rice fields east of Bangkok have mostly been plowed. Many small ponds scattered here and there, some obviously very temporary pools, some more established. Near Bangkok there are scattered dwellings surrounded by bamboo, Elaeocarpus, and other trees.

Further east there is a major pattern of canals running north and south at regular intervals, intersecting with one large one along exact course of plane. Fields are oriented perpendicular to these canals and all dwellings concentrated along canals. Most fields have been plowed, some are very wet.

Somewhat more to the east the canals become much less regular and seem, judging from oxbows, etc. to follow meanders of former streams to some extent. Here are a great many more ponds and in the

Thailand – ~~Cambodia~~ ?

general network of channels in the bottom-lands of the Bang Pa Kong river the regular rectangular pattern of the rice fields disappears. But it is still all rice cultivation.

Eastward of the river there seems to be no regular pattern. There are some long canals and a number of meandering water-courses, but the rice patches are not oriented in any regular manner. Villages are marked as patches of trees. Locally the rice seems submerged.

After some cloudiness the country is mountainous and forested, rather few clearings. Visibility poor. Then the course crosses a major escarpment, or rather follows just south of it, with a valley to the north with considerable clearing. Then the land becomes rather level, but almost entirely forested – a dense canopy characterized by abundant emergent trees. A single winding red road connecting scattered clearings. Then some gently hilly land, hills apparently rather high, densely forested, abundant emergent trees.

Then a north ~~[illegible]~~ eastward trending valley with considerable cleared land and a very different sort of forest, some apparently rather dry grassland along river. (Probably fallow rice land).

South of it a very level terrace, mostly forested with the same very even type of forest as in the upper part of the valley bottom, ~~a~~ completely without emergent trees. Then more meandering tributaries with broad belts of rice fields, now brown.

Then a large wooded plain, with, at first, some clearings and secondary forest, then solid forest, locally quite even textured, locally with emergents. Then rather large cleared areas. Soil very red. Cleared areas irregular in outline but

tending to follow drainage pattern to northward, evidently occupying the lowest parts of these very flat valleys.

Then cloudiness becomes almost complete.

Glimpses of land through clouds, ~~west of [illegible] and [illegible] [illegible]~~ show forest with numerous clearings.

Visibility again good west of Sisaket in Nam Mun valley. Mostly cleared and intensively planted to rice.

Nam Si River, entering Nam Mun above Ubon, shows amazing series of meanders and oxbows, some dry, some with water. Conspicuous reddish tan sand bars being built on convex sides of meanders. Country here, and especially just east of Ubon is a curious pattern of large patches of green, apparently brush fallow, with patches of brown rice fields. These with sparsely scattered trees. The green very much cut up into small patches, some cleared and burned, some actually tree covered. An air strip trending n.e.s.w. has evidently been rendered unfit for use by cross barriers and excavations.

Eastward the texture of this pattern becomes finer, the patches smaller, with less rice in proportion to shifting cultivation, then rice again predominates. At least there are small patches oriented like rice patches - no evidence of irrigation system from this altitude. (15,000')

Scattered trees become more and more abundant, watercourses accompanied by strips of woods.

Then a patch of wooded country, possibly slightly hilly, clearly secondary woods.

Visibility becomes poor again. Crossed Mekong but could not see it.

10 minutes west of Tourane Mountainous country, with rivers entrenched in V shaped valleys, trending north. Ridges wooded, but with slopes cleared irregularly, mostly in scrubby second growth. Some patches of good forest on high slopes. Streams not muddy. A fairly large river running easterly, becomes muddy lower down, though forest becomes better, less cleared eastward. Much less shifting cultivation and mostly continuous forest 5 minutes west of Tourane. Visibility poor. Some rice land in flat valley bottom. Poor second growth on slopes and ridges above this.

1956 South China Sea

At sea between Tourane and North Reef, about 15-20 minutes out. Curious tan colored patches on sea, diffused in an elongate manner parallel with wind waves and forming long irregular streaks, as though either a poorly miscible silt or a surface foam were drifting along, rather irregularly arranged by wind. This appearance extends for miles to the northward in irregular bands, some bands east and west also, but these cross banded ~~[illegible]~~ diagonal to principal swell pattern. At first sight appeared to be reflections of sun through holes in clouds, broken up by waves, but this incorrect, because the pattern is same viewed from any angle. No obvious explanation. Three principal areas affected, within about 6 minutes flying time. Another shortly after.

Water generally blue, but not brightest blue, because of thin overcast. More in long

thin bands or streamers a little farther on.

Could be a plankton bloom.

Patches become much more abundant and denser about 6 minutes farther east, as though someone had spilled gigantic sacks of bran on the surface of the sea which had then been irregularly carried down-wind, almost like innumerable tiny smoke bombs.

Judging by color of water, the depth here is not great. A mottled rather light blue, with some patches quite light.

Surface phenomenon now very common, extending in streaks miles long, irregularly cross banded, more diffuse eastward, but if anything more abundant. Visible far to southward, too, as well as to north. Is undoubtedly something on surface, like foam. More and more abundant eastward. Then extremely abundant northward but no more to east as North Reef is approached.

1956 South China Sea

North Reef is a perfect drowned atoll, with breakers all around except on west end. Lagoon in west end, about 2/3 as long as entire reef. Reef very broad, especially on east end. Only one very narrow channel, on s.w. corner, this not clear on inner end. Whole reef light green with brown patches and fine mottling. Lagoon with network of small reefs. No dry land at all.

A very few stringers of discoloration on sea surface east of reef, much visible to north, along course which is now northward.

After a few minutes no more discoloration seen.

A long island or two islands across mouth of harbor to east. These have little or no woody vegetation.

Hongkong

Approaching Hong Kong – many small rocky islands of all sizes.

Smallest outer ones with no vegetation or only grass.

Larger ones with grass and small thickets. Conspicuous reddish intertidal zone, occasionally a very narrow reddish beach. On most islets little woody vegetation, much exposed rock. Mostly not inhabited, but a small city on one in entrance to bay.

Coastline very intricate scarcely possible to distinguish larger mountainous islands from mainland. Mainland hills grassy, small patches of woods near tops, but very few. Many ridges bare and eroded, red.

Hong Kong Island more wooded

Hills back of Kowloon exceedingly eroded and bare.

Hongkong Island mainly grassy, but with low brush or brushy woods on steepest slopes and in ravines. A little terracing on slopes, but not much.

Entire area very rugged.

May 15 - area between Naha and Kadena Air Base -

A disturbance complex on deeply weathered reddish soil derived from limestone, with limestone knobs, chimneys, and pinnacles cropping out here and there.

The vegetation is a mixture of patches of Miscanthus, Imperata, low mixed thicket, scattered trees and clumps of Pinus luchuensis, ferns, and Cycas revoluta. Exposures of limestone generally fern-covered.

animals -
Lot 3. May 15,
land shell
Yaka, n.e. of Ishikawa
scrub-covered hills,
reddish soil

May 15 - Yaka, n.e. of Ishikawa

The hills here are covered with a degraded scrub mixed with Miscanthus sinensis on a sterile reddish soil with angular rock fragments.

Aristida, Dianella, Aletris, Spiranthes, Drosera, and Lindsaya, Gleichenia are common herbs, Schima, Symplocos, Vaccinium, Rhodomyrtus, etc. are common shrubs, with young Pinus luchuensis coming up everywhere in great abundance, to 2 or 3 m. tall. This area has been forest mostly pine, till after the war. Then it was logged off completely.

At the top of the beach is a row of Pandanus - probably the P. tectorius var. liukiuensis of ~~th~~ Walker's flora. It is certainly much like the slender plant of Ceylon, India, etc. in habit.

Cycas absent from this area.

May 15 - Area between Kin-son and Kochiya is limestone and generally cultivated. Cycas again noticed on scarps and outcrops.

Road across the island between Kochiya and Kobesoko - this area has also been cut over clean. It is covered by a scrub mixed with Miscanthus and, at higher altitudes, with Pleioblastus linearis. The higher part of this road is called Meiji-yama. It is said that during the period of the Meiji emperor when much money was available for forestry, much camphor was planted here. The scrub is about 2 m. high. Rhus, Aralia, Raphiolepis, etc. Small pines are scattered all through this.

animals -
Lot 4 May 15
Buma, s. shore of
Motobu Peninsula
land shells in sand at
top of beach, sub-fossil.

May 15 - Buma, on south shore of Motobu Peninsula

That beach of pale fine sand (sampled). At top of beach, thickets of Scaevola, both glabrous and densely pubescent forms growing side by side. On the sand are mats of Vigna - a smaller leafed plant than V. marina, much more compact, flowers perhaps larger. Ipomoea pes-caprae v. brasiliensis, Ixeris repens, Lippia nodiflora, Thuarea, etc. creeping on sand. Chenopodium acuminatum, erect, scattered among the prostrate plants. Among the Scaevola is also Clerodendrum inerme and Pandanus.

The bluffs and foothills above the beach are of limestone. They are covered by a low scrub of Pandanus, Cycas, Ficus (F. gibbosa, F. retusa, F. wightiana), Psidium guajava, Berchemia lineata, a dwarf bamboo, etc. mixed with Miscanthus and small pines.

May 15 – Yaka, n.e. of
Ishikawa, Kunigami-gun
seashore

36969 Hedyotis ~~(crassifolia)~~
6 on hard gray shale (or schist)
just above high tide level

√4 70 Euphorbia chamissonis Boiss.?
on sand at top of beach
Chamaesyce atoto (G. Forst.) Croizat

V. trifolia var. simplicifolia Cham.
√3 71 Vitex rotundifolia
on sand near top of beach

2 72 Thuarea involuta (Forst.) R. & S.
on sandy beach

4 73 Schima liukiuensis Nakai
sterile brushy hills
overlooking beach, common.

1 74 Selaginella liukiuensis Koidz.
shaded side of small
ravine on sterile brushy
hill overlooking beach

3 75 Vaccinium wrightii A. Gray
common on sterile brushy
hills overlooking beach

1 76 Spiranthes ~~sinensis~~ S. sinensis Ames
rare on sterile brushy
hill overlooking beach

1 77 ~~Lindsaya~~ Lindsaea orbiculata (Lam.) Mett.
rare on sterile brushy
ok hill overlooking beach

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1 m. ↓ prostrate, leaves fleshy;
flowers white, throat
closed by stiff hairs.

almost prostrate
lactiferous; leaves
pale beneath, sub-fleshy;
glands of involucre
greenish, pale.

prostrate, flowering
branches ascending,
flowers light violet
or bluish lavender.

[illegible] prostrate, rooting
at nodes, flowering
culms erect.

ok 5–15 m. ↓ large shrub; flowers
white.

prostrate, adhering to
earth, very fragile.

small shrub, fruit
dark red, immature,
said to be edible.

roots fleshy.

ok

1956 Ryukyu Is.

36978 Rhodomyrtus tomentosa ? (Ait.) Hassk.
1 common on sterile hills
overlooking beach

2 79 Psychotria serpens L.
occasional on sterile
hill overlooking beach

May 15 - Meiji-yama,
ridge in center of
island s.e. of Kobesoku;

2 80 Gleichenia linearis
var. ferruginea (Bl.) v. A. v. R.
abundant in low
scrub with dwarf
bamboo.

May 15 - Buma, on
south shore of Motobā
Peninsula west of Awa;

Arenaria serpyllifolia L.
2 81 ~~Sagina~~ serpyllifolia
on sloping limestone rock

2 82 Ficus ~~gibbosa~~ F. virgata Reinw.
on sloping limestone rock

3 83 Scaevola sericea Vahl
on low bluff at top of beach
(with 36984)

3 84 Scaevola sericea Vahl
on low bluff at top of beach
(with 36983)

3 85 Wedelia ~~biflora~~ (L.) DC.
on low bluff at top of beach

Okinawa

ok shrub 0.5 m. tall,
flowers rose-colored.

ok prostrate, branches
ascending at tips,
flowers greenish
white.

— Kunigami-gun
forming tangles.
— Dicranopteris linearis (Burm. f.) Underw.

— Kunigami-gun

5 m

6 m. shrub; veins white;
fruit orange red, not
mature; said to be edible.

3 m. ok hairy form — shrub
2 m. tall; flowers purplish.

2 m. ok glabrous form — shrub
2 m. tall, flowers purplish.

2 m. ok trailing herb, hanging
down; flowers yellow.

Calystegia soldanella (L) R.-S.

36986 Convolvulus soldanella L.
2 growing in sand
on upper part of beach

(var. japonicum?)

2 87 Chenopodium acuminatum
common at top of sandy beach

4 88 Vigna "marina"
common at top of sandy
beach

May 15 – Shio Gawa (Suga)
on south west side of
Motobu Peninsula, south
of Sakimotobu; Kunigami - gun

3 89 Ruppia maritima L. (flower)
abundant in brackish
stream near mouth

May 15 – Shushi, on
north side of Motobu Peninsula
Nakajin Protected Forest
Nakajin-Cho; Kunigami - gun
Broad leafed evergreen
forest

2 90 Lygodium microstachyum Desv.
common around edges of

1 91 Acer oblongatum
common in A. itoanum Li

4 92 Phyllanthus rhamnoides
common in edges of
Breynia officinalis Hemsl.

rhizome white, deeply
buried in sand,
flower pale lavender pink,
open in afternoon;
— stigmas 2, elongate.
erect

prostrate, forming
mats 1 m. or so across;
flowers yellow,
keel ~~st~~ not
twisted.

This is a brackish water, actively
flowing stream, lined with
Hibiscus tiliaceus, Clerodendrum
— inerme, Murraya paniculata, Arundo donax.
ok caespitose, weak,
trailing with current.
det. C. den Hartog 1969

fronds twining, tangled,
— terminal part fertile.
young tree, sterile.
— leaves glaucous beneath.
shrub 2 m. tall, flowers
yellowish, fruit erect,
reddish.

(Lasianthus nigrocarpus Masam.

36993 (~~Mephitidia nigrocarpa~~
3 common in shrub layer of

1 94 Randia canthioides
occasional in shrub layer of

3 95 Psychotria liukiuensis Hatusima
occasional in shrub layer of

1 96 Carex alliiformis C.B. Cl.

May 15 – Kami-motogue, end of Motobu Peninsula.
Limestone bluffs here are covered with an almost pure stand of Cycas revoluta.

May 15 – Nakajin Protected Forest, Shushi, Nakajin-cho.
A former shrine forest now preserved as a natural vegetation reserve.
This is a low thick forest up to 10-15 m. tall, part of it in a ~~[illegible]~~ ravine, the trees crooked and gnarled, with a complete canopy, and a fairly thick shrub layer. The walls of the ravine are of rough limestone.

weak shrub to 2 m. tall;
— flowers white, hairy.
shrub 2 m. tall,
flowers white; stigma strongly exserted, narrowly fusiform.
— shrub 2 m. tall;
flowers greenish.

The tree layer has Ficus, Fraxinus, Sapindus, Diospyros, Nauclea, etc. The shrub layer has various Rubiaceae, Arenga, Eleagnus, Acer, Calophyllum, etc. Herb layer of ferns. Breynia rhamnoides around edges.
Arenga here is definitely caulescent. The trunk of one examined was about 1.5 m. high, the top part covered by leaf bases, the bare part perhaps 6 cm. thick. Most of the plants have much shorter trunks, completely covered by leaf bases. Pinnae scarcely or not auriculate, fiber soft, cloth-like.

May 15 – Mts. south of Nakasoni

The higher parts of these hills, above the limestone, are covered with a vegetation predominantly of Gleichenia linearis, a thick blanket of it, with scattered Schima and Pinus (small).

May 15 – beginning about 1 mi. south of Nago there is a broad reef flat cut into a coastline of shale and limestone. At the shoreward side of this are frequent stretches of beach-rock. These occur south to at least even with Kadena.

May 16 – South of Shuri and east of Naha the hills are covered by an almost pure stand of Miscanthus. Before the war this was pine forest.

No cycads seen in this area.

May 16 – south point of island, south of Kiyan.

This is an area of "natural" grassland lying on a small rather rough plateau or [illegible] of limestone with pockets and small patches of chocolate-brown soil. Where the soil is thick there are patches of sweet potatoes, sugar cane, and other garden crops. Other parts, forming rather a "matrix" are ~~a~~ grass-covered, with principally Miscanthus, probably M. sinensis, but with some Imperata. On actual outcroppings of rough limestone the Miscanthus is mixed with scrub.

This scrub is composed of Pandanus sp., Toddalia asiatica, Wikstroemia, Cycas, Ficus, "Breynia"
Viburnum, Alpinia speciosa, Berchemia,
Pittosporum, Maytenus(?), tangled with Canavalia and Rhynchosia with some Dianella and much Ligularia. Near the edge of the cliff in the vicinity of the beacon Cycas is very abundant, only occasional farther inland.

The Pandanus here is small and rather scrubby, slender, and shows two principal types, both somewhat variable. One has the leaf spines rather long and strongly divergent (though on the same leaf this may vary a great deal) and widely spaced, and has the phalanges somewhat flat topped, the carpels scarcely separated at the top. The other form has the spines smaller,

more appressed, and the carpels separated more or less conspicuously at the tops. The fruiting heads of both types are about 15 cm. or less in diameter and spherical. The long-spined type is very much like the one in Ceylon, India, Maldives, etc. The other seems to be a form of P. tectorius. The two grow together and are not well separated.

The Miscanthus on Okinawa is quite variable, but certainly does not seem to be sharply separable into two species. One sort is broad-leafed and robust, the peduncles stout and tall. The other extreme has narrow flexible leaves, more slender culms and peduncles. However, there is no apparent sharp difference or boundary between them, either morphologically or geographically or ecologically.

May 16 - hills south of Ozato, south end of island.

On the broad limestone ridge south of Ozato is a large area of luxuriant Miscanthus with isolated shrubs and patches of scrub on limestone outcrops. The soil is a chocolate brown in color. Where it is thick are small patches of cultivation. Small holes have been dug scattered over the area, said to be from attempts ~~to~~ to find old shells for scrap metal.

The scrub on the rough limestone is composed of Viburnum, Cinnamomum, Macaranga, Mallotus, Toddalia, Pittosporum, Cycas, Dianella, Pandanus, etc. liberally mixed with Miscanthus. This area is fairly extensive. It does not seem to have been burned for several years, as there are scattered small pines.

May 16 - Southern Okinawa.

The whole area is a complex of patches of cultivation interspersed with grass and scrub. The principal cultivated crops are sweet potatoes, soy beans, sugar cane, a little rice in low places, a little maize, a few cabbages, etc.

The grass is on thin soil, slopes that are relatively steep, and on areas that are out of cultivation for military reasons. Scrub is generally on limestone outcrops. Cycads are fairly general on limestone but rare in center of island, commoner toward coast, abundant on actual coastal cliffs and bluffs. Pines become rare southward but are generally present except where there have been recent fires. They are absent in area just south of Shuri. Casuarina occasional southward, small.

1956 ~~Okinawa~~ Ryukyu Is.

May 18 - Kadena Air Base housing area. Small hills of limestone here with pine forest on them - the pines 10-20 cm. diam. and 5-8 m. tall, rather flat-topped. No underbrush but a complete ground cover of vines.

May 16 - hills south of Ozato; Shimajiri - gun on rough limestone outcrop in Miscanthus grassland.

36997 Nephrolepis cordifolia (L.) Presl
4 common in scrub

1 98 Carmona retusa (Vahl) Masam.
rare in scrub Ehretia microphylla Lam.

5 99 Mallotus japonicus M.-A.
occasional in scrub

37000 Croton cumingii M.-A.
2 occasional in scrub

1 01 Ficus erecta var. beecheyana (H. & A.) King
rare in scrub

02 Cinnamomum japonicum Sieb. ex Nees
occasional in scrub

4 03 Pittosporum tobira (Willd.) Ait.
occasional in scrub

3 04 Viburnum suspensum Lindl.
common

fronds erect

flower white

shrub 2 m. tall

low shrub

shrub 0.5 m. tall,
fruit green with red ripe.

shrub 2 m. tall, somewhat aromatic.

shrub 1 m. tall,
fruit smooth, immature.

shrub 1 m. tall,
berries juicy, scarlet

1956 Ryukyu Is.

May 16 - south end of island, south of Kiyan; On limestone soil with outcrops of rock

37005 Rhynchosia volubilis Lour. ?
4 common

1 06 ~~[illegible]~~ Celastrus Gymnosporia diversifolia
very common on rocks

3 07 Solidago japonica var. insularis Kitam.
occasional in scrub

3 08 Peperomia japonica Makino
pocket in rough limestone

2 09 Sedum formosanum N.E. Brown
common on rough limestone

7 10 Emilia sonchifolia (L.) DC.
common weed in sweet potato patch

2 11 Smilax sebeana Miq. det. T. Koyama 1959
occasional

4 12 Rhamnus liukiuensis (Wils.) Koidz.
occasional

2 13 Ficus retusa var. nitida Thunb.
common

2 14 Pittosporum tobira (Willd.) Ait.
rare

4 15 Ligustrum
common

1 16 ~~Cynanchum formosanum~~ Parsonsia helicandra H.+A.
rare

1 17 Cocculus trilobus (Thunb.) DC.
rare

2 18 Sida "rhombifolia"
occasional

Okinawa

(Kiyan) Shimajiri-gun

ok? extensive twiner, flowers yellow.

Maxim. semi-prostrate, flowers yellowish, fruit pinkish,

flowers bright yellow.

leaves ~~and~~ stems, and spikes fleshy

~~[illegible]~~ leaves fleshy.

ok flowers bright rose pink, somewhat exserted.

climber; fruit immature.

shrub; fruit immature

prostrate shrub

OK shrub, fruit immature

shrub

twiner; flowers greenish yellow.

twiner; flowers whitish

prostrate; flowers orange.

37019 Canavalia microcarpa
2 common on bare ground
5 20 Wedelia chinensis (Osbeck) Merr.
common in open grassy ground
3 21 Viburnum awabuki K. Koch
occasional

May 19 - Between Awase Meadows and Awase Air Field.

Hills of a very stiff gray clay, rather bedded and greatly shattered, simulating a shale but very soft.

The vegetation here resembles that on limestone, with Miscanthus and Cycas very prominent.

1 22 Galium
common on overhanging bank.

May 19 - North of Enobi
top of low ridge of deeply weathered mica-schist, the soil strongly laterized.

The vegetation here is very much degraded, reduced to a mixture of depauperate Miscanthus, Gahnia, Gleichenia linearis, Aristida, Vaccinium,

twining over ground and weeds. flowers rose pink

flowers bright yellow.

small tree 3 m. tall fruit scarlet, not quite mature.

; Nakagami-gun

stems weak, pendent.

Lycopodium cernuum, Osbeckia(?), Dianella, Paspalum, Solidago, Schima, Cassytha, Pteridium, Rhodomyrtus, Cassytha, and scattered small pines. A few other broad-leaf shrubs also common. The relative abundance of the principal plants observed is as follows:

a Vaccinium
a Gleichenia linearis
f Miscanthus
f Pinus luchuensis
f Gahnia
f Aristida
c Lycopodium cernuum
c Osbeckia ?
c Paspalum
c Schima
c Dianella
o Rhodomyrtus tomentosus
o Solidago
o Cassytha filiformis
o Pteridium aquilinum

The pines are scattered, very small, 1-3 m. tall, up to 6 cm. dbh usually smaller.

May 19 - ~~[illegible]~~ North of Enobi; Nakagami - gun on top of sterile ridge on hard reddish soil, depauperate vegetation.

37023 Paspalum orbiculare G. Forst.
2 local in muddy spots
2 24 Fimbristylis thomsonii Boeck. det. J. H. Kern
local in and around muddy spots
1 25 Poganotherum crinitum (Thunb.) Kunth
very local on slope.

On the sides of the ridge pines are more abundant and reach a somewhat larger size. The Miscanthus is more abundant and larger, as are Schima and other shrubs.

There are also many more species of plants on these slopes than on the ridge.

This is representative of fairly large areas in this vicinity. In places the grass is more prominent and the pines smaller and less abundant.

OK A. Chase

seattered culms a — very loosely caespitose. very small tufts, culms ascending to spreading.

det A. Chase

May 19 - in general area between Iha and Nakadomari, and isthmus to north and hills to south are fairly large areas of hilly land covered by low sparse Miscanthus with Vaccinium, Gleichenia, small pine seedlings, etc., on a red lateritic soil.

37076 a Emilia sonchifolia (L.) DC. ok
rare
flowers purplish

Animals. Lot 5 May 19
Bolo Point
land shells, living and sub-fossil, in pockets on high pitted limestone rocks at top of cliff.

May 19 - Bolo Point; Nakagami-gun - on and around jagged rough limestone

37076 Berchemia lineata DC.
6
abundant locally

1 4 27 Ischaemum aureum (H. & A.) Hack. det. 19 Chase
very local on vertical surface

4 28 Phyllanthus? ~~X~~
common Securinega flueggeoides M.-A.

May 19 - Bolo Point - this is a slightly rolling area, largely covered by grass - Miscanthus and Imperata. Around the edges ~~are~~ are the remnants of a rim of very rough pitted limestone. On this is a scrub of Pandanus, Toddalia and a number of other shrubs, or on the steeper and more jagged surfaces, a scattered vegetation of Sedum, Peperomia, Portulaca okinawensis, Hedyotis sp., Ischaemum, and several other small herbs, and Berchemia and Paederia. The rock surface is almost honey-combed. Land snails are abundant.

intricately branching prostrate shrub, close to limestone surface.

caespitose.

low shrub 3-4 dm. tall, branched at base; flowers white, fragrant.

1956 Ryukyu Is.

37029 Hedyotis
2 in crevices and pits on vertical surfaces

2 30 Ischaemum crassipes var. formosanum (Hack.) Nakai det. A. Chase
in depression in soil back from rim.

2 31 ~~Ixeridium~~ Ajuga pygmaea A. Gray
in pits on vertical surfaces

1 32 Portulaca okinawensis
in pits on vertical surfaces

3 33 Boehmeria nivea B. nipponononivea var. concolor Ohwi
local

1 34 Ipomoea littoralis
common

May 19 – Bolo Point Beach, southwest of Masuya – Kunigami-Gun
~~3~~ on sand ridges back of beach.

2 35 Wedelia prostrata (H. & A.) Hemsl.
occasional

5 36 Glehnia littoralis F. Schmidt
common

1

1 37 Plantago major L. P. asiatica L.
roadside

Okinawa

prostrate; leaves fleshy; flowers white.

prostrate, leaves green above, pale beneath, corollas violet.

prostrate, fleshy; roots thick and rather tuberous; leaves alternate, oblong; flowers bright yellow within, orange without, stamens 20 or more.

depressed shrub, short branches erect. flowers magenta.

prostrate, fleshy.

leaves coriaceous ~~fleshy~~; flowers white, fruit fleshy.
"shi'i bohu" or "shibo" said to be used for a tea to treat colds or coughs.
leaves, said to be ~~used~~ ~~to~~ crushed as poultice for sores.

May 19 - Bolo Point Beach

Ridges of lime-sand back of beach 1-2 m. high. The sand is being excavated and hauled away by truck. Also sweet potatoes are planted on some of the ridges.

Vitex rotundifolia forms mats on some of the ridges, also Ipomoea pes-caprae, ~~and~~ Wedelia. ~~Ixe~~ Ixeris repens forms extensive underground systems of stolons, as does Convolvulus soldanella. A grass, like Sporobolus virginicus, is abundant in places. A very large grass, probably Spinifex littoreus, is local and very extensively creeping. Glehnia is common, very deeply rooted.

May 21 - directly west of Okinawa are two small flat islets and a sand bar. The islets are green but can't make out any detail. Southwest of these are several high islands.

Southwest of Okinawa a short distance is a tiny circular reef with a depression in center, most of reef shows some dry land at low tide, a small islet on north side, with beacon or marker. apparently always emerged. no vegetation apparent.

1956 Ryukyu Is.

~~3/4~~ 2 km. s. of Ozato
May 22 - ~~3/4 mile n. of Moriyama~~
thin grassland
37038 Uraria crinita Desv.
common locally in

May 22 - ~~1½ mi. n. of Moriyama~~
~~[illegible]~~ just n. of Nusukun-muku,
1.4 km. s.w. of Ozato
39 Blyxa ~~coreana (Lévl.) Nakai~~
aubertii Rich.
growing submerged, rooted
in mud in paddy field.

May 22 - ~~1 mi. 10° w of n. of~~
2 km. s.s.w. of Ozato
~~Moriyama~~ s of Nusukun-muru
thin grassland
1 40 Emilia sonchifolia (L.) DC.
in disturbed grassland
(forest plantation failure)
1 41 Wahlenbergia ~~gracilis (Forst.f.) A.DC.~~
occasional in W. marginata (Thunb.) A.DC.
1 42 Emilia sonchifolia (L.) DC.
rare on eroded rocky place in

1 43 (~~[illegible]~~) Justicia procumbens var. riukiuensis Yamam.
rare on eroded rocky ground
1 44 Cyperus (Kyllinga) K. cylindrica Nees
rare on steep slope in
1 45 Cyperus (Kyllinga) brevifolia
rare on steep slope in K. brevifolia Rottb.
1 46 Aneilema
rare on steep slope in
1 Murdannia nudiflora (L.) Brenan

Ishigaki

60 m.

ok ~~spike~~ racemes erect,
flowers bright rose pink

det. C. den Hartog 1969 (fruit) flowering scape erect,
flowers emerged, purple.

80 m.

ok flowers purplish,
slightly exceeding
— involucre.
flowers blue

flowers pinkish purple,
somewhat exceeding
involucre

det. E. C. Leonard — flowers purplish
— pink, lip deep maroon purple.
heads whitish green.

heads green.

flowers purplish pink,
2 large stamens with
blue anthers, one slender
staminode, 3 small
stamens with yellowish
deeply lobed anthers.

1956 Ryukyu Is.

37047 Paspalum orbiculare G. Forst.
3 common in

1 48 ~~Borreria~~
rare in Hedyotis tenelliflora Bl.

5 49 Blumea hieracifolia (Don) DC. det
common in J. Randeria 1958

0.5 km. s. of Nusukun-Mura
May 22 - ~~0.7 mi. 37° w. of N.~~
2.3 km. s.sw. of Ozato
~~from Moriyama~~
open stony grassland

5 50 Helicteres angustifolia
common in

5 51 Rosa bracteata Wendl.
common in

3 52 Eurya E. japonica var.?
common near edge of
ravine in

1 53 Cassia ~~mimosoides~~
rare in C. leschenaultiana var. pacifica Ohwi

2 54 Fimbristylis
rare in

1 55 ~~Borreria~~
rare in Hedyotis tenelliflora Bl.

5 56 ~~Cy~~ ~~Andropogon~~ Cymbopogon tortilis var. goeringii
common, locally dominant in

2 ✓ 57 Sorghastrum
rare in Sorghum nitidum (Vahl) Pers. (Hanold form, or yet without a distinct name)

1 58 Blumea
rare in

1 59 ~~Melastoma~~ Melastoma candida var. nobotan (Bl.) Mak.
occasional in
Osbeckia chinensis L.

OK A. Chase — slightly tufted.

~~flowers~~ corolla white, calyx green.

erect, disk yellow

50 m.

spreading to ascending
from root crown: corolla
lavender.

procumbent shrub,
flowers white

erect shrub 2 m. tall,
(mostly lower), fruit
green.

flowers yellow

culms ascending

~~flowers~~ corolla white, calyx
purplish.

(Steud.)
Hand.-Mazz. det A. Chase — tufted, erect.

det A. Chase — erect

erect, disk yellow.

flowers rose pink

1956 Ryukyu Is.

May 22 0.5 km. s. of Nusuku-Mura ~~0.7 mi. 32° w. of s.~~ 7.7 km. s.s.w. of Ozato

~~from Moriyama~~

on large limestone boulders or remnants

37060 3 Galium
locally common

2 61 (~~[illegible]~~) Gonostegia hirta (Bl.) Miq.
locally common

3 62 Phaseolus
common

5 63 Ampelopsis brevipedunculata
common (var. maximowiczii (Regel) Rehd.?)

(Microsorium scolopendria (Burm. f.) Copel.

1 64 Polypodium scolopendria Burm. f.
locally common

1 65 Vernonia cinerea (L.) Less.
rare

2 66 Callicarpa japonica var. luxurians
local

1 67 Emilia sonchifolia (L.) DC.
rare

2 68 Leucas
occasional

1 69 Cyperus cyperoides (L.) O. Ktze.
occasional around base of boulders

5 70 Pittosporum tobira (Willd.) Ait.
common

1 3 71 Lygodium japonicum (Thunb.) Sw.
common rooted in ground, climbing on boulders

~~32~~

Ishigaki

50 m. scattered in grassland.

prostrate to pendent, roots yellow, flowers green.

— scrambling; flowers yellowish.

— twining; flowers yellow, keel twisted.

— climbing vine, flowers yellowish green. fruits immature.

— rhizome bluish green.

Rehd. det. G. H. [illegible]

sub-shrub; flowers pale lavender

ok — flowers purplish, somewhat exceeding involucre.

— flowers white.

ok shrub 1.5 m. tall, fruit immature (two actual plants represented)

3 72 Raphiolepis liukiuensis (Koidz.) Nakai
occasional

1 73 Carmona retusa
occasional Ehretia microphylla Lam.

2 74 Oxalis corniculata L.
common in pits and crevices

5 75 Dianella ~~ensiformis~~ ensifolia (L.) DC.
common

May 22 – 1 mi. 16° w. of n. of Mashiyama (1, 2, 3 on photo 945-16)

(1) Short, rather sparse grass on gentle slope extending out from foot of small but steep hill. The ground is only thinly covered. Imperata, up to knee high, is dominant, mostly not so tall. There is generally a strong admixture of Lygodium, the fronds only 1–3 dm. long. ~~Locally a~~ Young plants of a fern (probably a species of Thelypteris) are common to abundant generally. There is some Lespedeza cuneata, and a very little Blumea. Locally Pteridium and Gleichenia

shrub 1 m. tall, rarely fruiting, fruit immature.

— depressed shrub, fruit ~~immature~~ red when ripe.

— flowers yellow.

flowers sky blue, fruits bright dark purplish blue when ripe.

form patches (separately), some rather large.
Small shrubs or sprouts are scattered generally, especially Osbeckia.
Pits or "foxholes" are scattered here and there – from the war. These are characterized by Blechnum orientale, Ficus, ~~and~~ Osbeckia, Gleichenia, etc.
This area has probably been burned in relatively recent time, though no very obvious evidences remain. The grass is thinner than usual for Imperata. Some ground is to be seen between the tufts of grass and other plants.

1956 Ryukyu Is.

(1) Plants observed:
Imperata
Rubus
Rosa
Thelypteris
Lygodium
Paspalum orbiculatum
Psidium guajava
Centella asiatica
Lactuca sp.
Lespedeza cuneata
Desmodium sp.
Chrysopogon aciculatum
Smilax
Osbeckia
Scleria
Blumea
Pteridium
Gleichenia
Oxalis

Ishigaki

(2) On steep slopes a tall dense stand of Imperata has been grubbed out in rows and left in rows, about 1-1.5 m. apart. The part left is dense and about 0.75 m. tall. In the cleared strips pine seedlings have been planted, or on lower slopes, Acacia confusa and Casuarina. The pines have mostly died. The Imperata is coming back here, along with Lygodium, Scleria, and many other weeds. This slope may not have been burned as recently as some of the others.

(3) A gentle slope at the foot of (2) is a mixture of Imperata, Andropogon, Scleria, etc. with scattered small pine trees and with a rather thriving plantation of small Casuarina and Acacia saplings.

May 22 - 0.8 mi. 32° w. of n. of Omoriyama

(4) (Photo 945-16)

Gently sloping terrace of stony soil, in places, at least, a gravelly clay. On the surface are scattered a few huge limestone boulders and remnants. This limestone is a very rough pitted reef limestone.

The vegetation is a thin grassland of Imperata with some Andropogon, Scleria, Fimbristylis, Cyperus, Rhynchospora rubra, Setaria, with scattered subshrubs of Osbeckia, Rubus, ~~the~~ Helicteres ~~Grewia, lythraceous(?) plant,~~ Rosa, etc. apparently sprouting from rootstocks after burning. Herbs such as Blumea, Centella, Lespedeza cuneata, Cassia, and especially Lygodium scattered through the grass. On small escarpments and ravine walls Andropogon is most important grass. Locally a few bushes of Eurya.

much bare earth visible.

Ravine bottoms are wet and mostly occupied by small paddy patches.

Here are various other species of marsh plants and weeds.

The limestone boulders mostly lie on a surface of schist or gravelly clay. The limestone has a very different vegetation, mostly shrubby. Three such boulders or remnants were examined. The following plants occurred there, numbers indicating how many of the boulders each plant was seen on.

Premna obtusifolia	3
Pittosporum tobira	3
Ampelopsis	2
Clematis	1
Oxalis corniculata	3
Ficus (at least 4 spp.)	3
Boehmeria nivea	3
Morus sp.	3
Rubus sp.	3
Dianella ensifolia	3
Gynura	2
Wikstroemia	3
Hoya?	2
Callicarpa	2
Bauhinia	1
Polypodium	1
Arenga	2
Leucas	2

1956 Ryukyu Is.

Phyllanthus sp.	1
Carmona retusa	2
Artemisia	1
Lilium longiflorum	1
~~Carlina~~ ? Cirsium	2
Phaseolus	1
(Melast.)	1
Rosa	1
Paederia	1
Eupatorium	1
Thelypteris	1
Torilis	1
Galium	1
Miscanthus	2

Numbers 1-4 are indicated on photo 945-16.

Ishigaki

May 23 – 1 km. n.w. of mouth of Todoroki-gawa

(5) (photo 940-48) Low rolling hills of schist or gravel with schist boulders and a few limestone boulders on surface. soil very stony. The better spots are cultivated, mostly in sweet potatoes. The ravine bottoms mostly wet and in small paddy fields.

This is a thin grassland with much bare earth visible. Imperata is a minor component, with Andropogon (2 spp.) and Lygodium dominant, subshrubs of Psidium, Rosa, Rubus, etc. common. These are apparently root sprouts from burned off plants. The grass is thinnest on stony hill-tops, most luxuriant in hollows. Here, if it is wet, are many additional species. There are patches where Imperata is more common than generally. Limestone boulders have a shrubby vegetation.

1956 Ryukyu Is

Plants seen in grassland with their relative abundance:

a	Andropogon (2 spp.)
a	Lygodium
f	Chrysopogon aciculatum
f	Rosa
f.	Psidium guajava
c	Blumea
c	Artemisia ~~spp.~~
c	Lespedeza cuneata
c	Centella asiatica
l c	Imperata cylindrica
l c	Vernonia
o	Rubus
o	Lilium longiflorum
l	small ~~labiate~~ acanth.
o	Evolvulus
o	Setaria
o	Paspalum
o	Uraria
l	Fimbristylis (monost.?)
r	Fimbristylis dichotoma
r	Cassia mimosoides
r	Cyperus (Kyllinga) sp.
r	Cyperus cyperinus?
r	Scleria
r	Wahlenbergia

Ishigaki

May 24 1.2 km. 30° w. of n. ~~[illegible]~~ of mouth
(6) (photo 940 - 48) of Todoroki-gawa

Essentially similar situation to (5), lacking limestone, schist actually exposed on some hilltops.

Vegetation similar, perhaps Imperata generally more important. Local differences in relative abundance of plants. Evolvulus frequent. Helicteres ~~Lythraceous (?) subshrub~~, Hydrocotyle sp., Lactuca sp.,

same
(7) (photo 940-49)
~~[illegible]~~ Rough knobs of schist, with a few tiny remnants of very rough limestone on top.
Shrubby vegetation scarcely developed, but a few dwarfed Premna, Ficus (2 spp.), Psidium, Carmona, Morus, etc. with tufts of Miscanthus and Dianella. Some Paederia, Phaseolus, Artemisia common. Sida, Rosa, Pueraria Vernonia, Rubus, Lygodium.

May 24 1.8 km. n. of Moriyama, s. of Ozata

(8) (photo 945-14)

Gravel terrace with some large schist boulders. Dendritically dissected, the ravines with rice patches, but in upper reaches and small branches where the ravine is narrow and walls steep, they are filled with a mixed scrubby forest with Ficus, Macaranga, Rhus?, Arenga, Pandanus, Angiopteris, and various other shrubs and small trees.

The flat tops and steep sides of the terraces are mainly Imperata but with some other plants. Rather sparse with some soil showing.

May 24 ~~1.8~~ 15 km. n. of Moriyama s. of Ozata

(9) (photo 945-14)

steep hills with Imperata, cut into strips and pine planted but not thriving, as in (2) (May 22, p. 115)

May 24 ~~[illegible]~~ 2 km. 20° w. of n. of ~~n. of Moriyama,~~ mouth of Todoroki-gawa s. of Ozata

(10) (photo 940-48)

rolling plain of rough limestone "feo" grassland somewhat grazed. Characterized by Imperata in form of discrete bunches about 0.6-0.8 m. tall, not flowering, but each bunch sheltering several culms of Paspalum orbiculare making it appear that the ~~[illegible]~~ bunches are of Paspalum. The bunches are up to 2 m. apart or even more, usually 0.5-1 m. Often they are compound bunches, Imperata + Psidium, or Imperata + Rosa, or Imperata + Psidium + Rosa. Rosa and Psidium are very

1956 Ryukyu Is.

Heavy soil.

frequent. Between the bunches is a low sod-like ground cover of mixed herbs, prostrate Rosa, and grazed down grasses, with scab-like patches of rough limestone. The plants observed were:

a Imperata cylindrica
a Psidium guajava
a Rosa
a Hydrocotyle
c Wikstroemia
Verbena
Paspalum orbiculare
Paspalum scrobiculatum?
Galium
Wahlenbergia
Setaria
Stachys
Chrysopogon
Rubus
Fimbristylis 2 spp.
Plectranthus?
r Vernonia
c Centella asiatica
o Digitaria chinensis
o Sida
o Oxalis corniculata
r Carmona retusa
Lippia nodiflora
~~labiate~~ acanth.
Phaseolus

Ishigaki

Boehmeria
~~Carlina?~~ Cirsium
Digitaria henryi
Blumea
Torenia
Lilium longifo~~lium~~rum
Torilis
~~[illegible]~~ Apium?
Eupatorium?
Ampelopsis

A small sink hole is choked with Pandanus and some Macaranga, Morus, Alpinia speciosa, Toddalia, Boehmeria, Ampelopsis, Psidium, Ficus, Smilax, and a few other shrubs + vines, + ferns.

The Pandanus is in habit exactly that of Ceylon. When really ripe the fleshy part is swollen and pushes the keys apart. Largest heads about 15 x 22 cm. Spines more slender + appressed.

Nearby lying on the limestone plain is a schist boulder almost the size of a jeep. It is worn and rounded.

(11) (Photo 940-48)
small round hole in schist - like a bomb crater. Water in bottom with grass. little woody vegetation.

12 (Photo 940-48)
Imperata grassland with, on one rolling hill abundant discrete bunches of Andropogon. Other similar hill adjacent is Imperata without Andropogon.

May 24 0.5 km. n. of mouth of Todoroki-gawa

(13) (Photo 940-48 and 940-22)
remnants of rough limestone on reef flat. Undercut, very deeply pitted.
Vegetation low, nestling in pits, nothing over about 0.5 m. tall.
Composition:

a Zoysia tenuifolia
a Pemphis acidula
a Ischaemum
a Hedyotis albido-punctata
c Lysimachia mauritiana
f. Crinum
l Messerschmidia argentea
c Angelica
o Lepturus repens
r Pilea
o Vitex

1956 Ryukyu Is.

May 24 - 1.2 km. 30° w. of n. of
(6) mouth of Todoroki-gawa

short sparse grass
on rolling hills

37076 ~~[illegible]~~: Gonostegia hirta (Bl.) Miq.
5 roadside ditch

5 77 Rubus parvifolius var. triphyllus (Thunb.) Nakai
common on roadside
banks (and on rock outcrops
and generally in grassland).

5 78 Osbeckia chinensis
Melastoma candida var.
~~[illegible]~~ Roadside bank
(common generally)

2 79 (Thelypteris gongylodus
Cyclosorus gongylodus (Schkuhr) Link
common in wet spot
in hollow, growing in mud

3 80 Polypodium
Microsorium alternifolium (Willd.) Copel.
common in wet spot
in hollow, growing in mud.

5 81 Paspalum orbiculare G. Forst.
common in small weedy
abandoned cultivated patch

4 82 Centella asiatica (L.) Urb.
common in small
weedy abandoned cultivated patch

1 83 ~~[illegible]~~ Mitrasacme pygmaea R. Br.
rare in disturbed ground
in weedy abandoned
cultivated patch

1 84 Digitaria ~~chinensis~~
D. violascens Link
occasional in weedy
abandoned cultivated patch

2 85 Setaria viridis (L.) Beauv. (Bristle yellow- [illegible])
occasional in weedy
abandoned cultivated patch

Ishigaki

50 m.

weak herb, scrambling
in other vegetation

procumbent, branches
ascending; fruit red, juicy
good flavor; receptacle
conical, orange.

nobotan (Bl.) Makino

shrub up to 0.8 m. tall;
flowers bright rose
purple.

rhizome creeping,
fronds erect, all seen
sterile.

rhizome creeping,
fronds strictly erect.

det. A. Chase

culms spreading

prostrate, rhizomes
superficial.

flowers white

det. A. Chase

culms spreading

det. A. Chase

1956 Ryukyu Is.

37086 Cyperus polystachyos Rottb.
1 rare in weedy abandoned cultivated patch

5 87 Gynura Erechtites hieracifolia (L.) DC. ex.
common in weedy abandoned cultivated patch.

5 88 Sida acuta Burm. f.
common in weedy abandoned cultivated patch

5 89 Evolvulus alsinoides L.
common generally on stony slopes

1 90 Lactuca indica ssp. laciniata (Houtt.)
occasional on stony slopes

5 91 Wahlenbergia marginata (Thunb.)
common generally on stony slopes

May 24 2 km. 20° w. of n. of mouth of Todorokigawa
(10) ~~rough~~, coral plain, pitted, heavy soil in pits,

1 92 Vernonia cinerea (L.) Less.
occasional ~~in~~

1 93 Paspalum orbiculare G. Forst.
occasional

1 94 Galium
occasional on rough rock

2 95 ~~Stachys~~ Clinopodium chinense L.
occasional

1 96 Paspalum orbiculare G. Forst.
common, in bunches of Imperata

→ Crassocephalum crepidioides (Benth.) S. Moore
det. R. O. Belcher

erect, heads nodding, dark brick red.

prostrate, flowers orange.

prostrate; flowers blue-violet.

— & L. Stebbins

erect. flowers pale yellowish-white.

A. DC.

erect, flowers blue-violet.

30 m.
with bunch grass (Imperata)

DC.
flowers purple

det. A. Chase

flowers greenish

flowers rose pink

det. A. Chase
erect

1956 Ryukyu Is.

37097 Fimbristylis monostachya (L.) Hassk.
2 common in heavy soil
1 98 Torilis japonica (Houtt.) DC.
occasional.
1 99 Torilis
occasional
37100 ~~Coleus~~ Salvia plebeia R. Br.
1 occasional
1 01 ~~Torenia~~ Lindernia crustacea (L.) F. v. Muell.
rare in heavy soil
~~5 02 Pandanus tectorius Parks?~~
5 02 Hydrocotyle sibthorpioides Lam. var. sibthorpioides
common in heavy soil
5 03 Dioscorea opposita Thunb.
in sink hole
5 04 Pandanus tectorius P. var. liukiuensis Warb.
abundant in sink-hole

May 24 east coast,
0.5 km. n. of mouth of
Todoroki Gawa
(13) ~~([illegible])~~
on pitted top of undercut remnant
of limestone platform
about 4-5 m above present
reef flat on which it stands. 4-5 m
05 Messerschmidia argentea (L.f.) Johnst. ok
common

Ishigaki

tufted

flowers white

erect aromatic herb
— corollas blue-violet.
flowers purplish.

stem prostrate,
— branches erect.
vine, twining on
— other vegetation.
low twisted tree,
fruit ~~[illegible]~~ 15 by 20 cm.,
at maturity the pulpy
bases of keys greatly
swollen, separating
the apical hard parts.

depressed shrub, 0.5 m.
tall; leaves fleshy,
frosty appearing,
flowers white.

1956 Ryukyu Is.

Oldenlandia ramifolia A. DC. vel aff.

37106 Hedyotis
5 abundant ~~in~~ on
pitted surface

5 07 Pemphis acidula Forst. Rhbr.
abundant

2 08 Zoysia tenuifolia Willd.
abundant

5 09 Lysimachia mauritiana Lam.
common

5 10 Lepturus repens var.
common

5 11 Ischaemum aureum (H. & A.) Hack.
abundant

1 12 Limonium arbusculum (Max.) Mak.
local on most exposed
pitted surfaces

2 13 Pilea peploides H. & A.
local in pits

3 14 Crinum asiaticum "var.
common on landward
side, ~~in~~ slightly
sheltered from spray.

May 25 - same

15 ~~[illegible]~~ Philoxerus wrightii Hook. f.
undercut sides of small eroded
6 remnants of ~~[illegible]~~ reef
rock and beach rock on
reef at or near high tide
level.

leaves fleshy;
flowers white

OK prostrate shrub;
flowers white.

OK? A. Chase – tufted; all seen sterile.

OK – leaves fleshy, flowers
– white, fruits reddish.

OK A. Chase erect

det. A. Chase stems prostrate,
tips ascending.
– cushion plant,
— L. wrightii (Hance) O. Ktze. leaves sub-fleshy;
– all seen sterile.
stems fleshy, soft.

japonicum Baker" rosette plant,
neck up to 20 cm or
more tall, thickest
at base somewhat
contracted upward.

forming dense mats,
leaves fleshy; flowers
rose purple, stamens
opposite perianth parts.
ovary with 2 stigmas,
one seed, surrounded
at maturity by enlarged
fleshy disk.

1956 Ryukyu Is.
east coast
May 25 - 0.5 km. s. of mouth
of Todoroki Gawa
(14)
on slightly elevated shore
line with beach ridge
and low pitted limestone
bluffs and platform

3 37116 Spinifex littoreus (Burm. f.) Merr.
sandy beach
5 17 Phaseolus
sand on pitted limestone

E. atoto Forst. (Chamaesyce atoto (Forst.) Croizat)
8 18 Euphorbia chamissonis
seaward ~~slope of~~ sandy beach ridge,
very common.

1 19 Ixeris japonica Nakai
locally common on seaward
slopes of sandy beach ridge.
5 20 Cirsium brevicaule var. irumtiense Kit
common in sand
5 21 Ixeris repens A. Gray
common on seaward
slopes of beach ridges and
on upper part of beach

1 22 Crossopus wrightii Hara
~~very~~ rare on pitted limestone
cliff.

---

3 m. det. A. Chase
— prostrate, extensive
4 m. — forming large loose mats.
prostrate, extensive
from deep root crown;
flowers yellow, keel
— twisted.
4 m. stems spreading,
slightly ascending,
lactiferous; leaves
pale beneath; involucre
glands narrow, yellow-
— green.
3 m. rhizome buried in sand;
flowers yellow.
4 m. flowers purple.
3 m. ok extensively creeping
by long white succulent
underground rhizomes;
flowers yellow. leaf blades
and flower scapes only
above sand surface.
4 m. ok — flowers white.

1956 Ryukyu Is.

37123 Indigofera liukiuensis Mak.
5 abundant on pitted limestone

5 24 Zoysia matrella (L.) Merr.
abundant on pitted limestone back from shore

1 25 Alysicarpus vaginalis (L.) DC.
rare on pitted limestone

1 26 Fimbristylis cymosa
rare on pitted limestone

May 25 - YCAT Compound
3 km. w.n.w. of center of Ishigaki City
In grassy area or "lawn" around buildings

1 27 Setaria viridis (L.) Beauv.
1 28 Panicum paludosum Roxb.
1 29 Digitaria sanguinalis (L.) Scop.
1 30 Sporobolus elongatus R. Br.
1 31 Digitaria sanguinalis (L.) Scop.

May 25 east coast, 0.5 km. n. of mouth of Todoroki-gawa

(13) Reef flat strewn with boulders, ~~both~~ mostly pitted limestone, some very large, some schist. Remnants of at least two older reef surfaces or planation surfaces or platforms represented, one by the 3 undercut remnants

---

Ishigaki.

uc 4 m. prostrate; flowers red.

uc - A. Chase

uc prostrate

uc?

2 m.

det. A. Chase rhizomes deeply buried.

culms spreading from root crown.

~~mentioned~~ ~~described~~ previously, at 4-5 m. above present reef flat, rough and uneven on top, strongly undercut on all sides, ~~are~~ and by low bluffs on shore, mostly covered by beach ridge; another by a platform at 1-1.5 m. very flat-topped. A remnant, possibly of this, but with ancient beach-rock on top, at 1.5-2 m., undercut.

Sample later taken of this beachrock by Helen Foster to have thin section made for examination of aragonite cement. Around undercut edges of this, under overhang, is a strange Illecebraceous plant, fleshy, densely matted or in cushions, apparently covered by highest tides. Another sterile dwarf shrub (37112) with it. Present reef flat represents third surface. On this are curious flat-bottomed rimmed basins, the bottoms of hard limestone with somewhat abraded surface, the rims, 3-6 cm. high, are of sandy limestone resembling beach-rock. These are common about midway between shore and the 3 large erosion remnants mentioned above. General surface, otherwise, very flat, except for occasional depressions. Many long or short cracks in reef flat, but these are rather irregular, rather than the straight or arcuate ones on atoll reefs

May 25 — east coast, 0.5 km. s. of mouth of Todoroki-gawa. (14) (photo 940.22)
Coast line of low pitted, often undercut limestone cliffs, 3-5 m. high, in places covered by a sand ridge. The nips where they are undercut is unusually abraded out, with many rounded boulders accumulated in reentrants. At its base is a rather smooth erosion ramp a few m. wide grading insensibly into the broad reef flat. On the flat are numerous boulders of limestone, of all sizes, very rough, sharp, and pitted, mostly concentrated near shore, scarcely any near reef margin. Reef flat very wide.
Cliffs with Hedyotis abundant in pits, also a few other plants. On top, where surface is exposed, ~~it is~~ rough and pitted, Zoysia tenuifolia is very abundant but does not completely cover ~~on~~ rocks. Back 30 or more

m. this is replaced by Zoysia matrella. Scaevola and Messerschmidia are scattered over this, in places forming a closed scrub. In open places Indigofera liukiuensis is abundant, as well as prostrate Pemphis acidula. Back from the edge Pandanus makes up much of the scrub.

May 26 – north side of isthmus east of Yarabu-dake
(18) (photo 950-124)
Cultivation on fine Shiraga sandy loam on flat land somewhat back of sea. This grades back toward higher land into a very dark fine loam, certainly like Arno Atoll Series in color and in the pale sand underlying about 25 cm. of it. But much finer and siltier and apparently quite fertile. Sugar cane growing very well on it.

May 26 – 2.3 km. e. of Yarabu-dake

(15) (photo 950-124) gravelly littoral knoll on broken rock and gravel, well drained.
Tall Imperata, up to 0.3-1 m tall, dense stand, with some scattered small tufts of Miscanthus floridulus, Themeda, Pteridium, Artemisia, Lespedeza cuneata, minor amounts of Scleria, Lygodium, Osbeckia, Paspalum, Rubus, Ficus (seedling), Phaseolus, Desmodium, Lilium, Melast. (shrub.), Wahlenbergia, Sorghastrum, Andropogon, Labiate, Acacia confusa, Psidium, Rosa, Cyperus, Uraria, Lactuca.
This varies locally, some patches being very weedy, and with Imperata only in patches, indicating more recent cultivation.
Across road in thick Imperata are small spots where it has been cut or burned off. Here it looks just like the sparse grass on other side of island. In these spots the Imperata is flowering, not elsewhere.

May 27 - 3 km. n. of Banna-dake
~~[illegible]~~ Maguna Valley
(16) (Photo 945-97)

Patch of forest around shrine.

Rather dense, canopy 10-15 m., mainly of several species of Ficus which have compound trunks and large spreading, often umbrella-shaped crowns, ~~little a~~ few ~~no evidence of~~ supporting trunks from large limbs. Macaranga, Melia, Melanolepis, etc. are also part of canopy. Garcinia is planted along walk and to some extent is in the second story. A loose irregular second story made up also of Evodia, Pouteria, Ardisia, Diospyros, ~~etc.~~ Morus, Diospyros etc.

Under story of Arenga, in large clumps, the trunks up to 3-4 m. leaves to 5-6 m.

With this on the ground are Alocasia, ferns etc.

Ardisia
Macaranga
Ficus 3-4 spp.
Morus
Pandanus
Arenga
Garcinia spicata
Melia azedarach
Pouteria glomerata
Melanolepis?
Evodia
Alocasia cucullata
Paspalum conjugatum
Thelypteris unita?
Citrus sp.
Premna obtusifolia
Diospyros maritima

May 27 – Shira+ Mizu,
head ~~[illegible]~~ north branch of Nagura ~~River~~, Valley,
(17) (Photo 945-22)
flat valley bottom
being drained.
Deep peat soil or peaty
muck – rather jelly-
like but fibrous apparently with grass roots.
judging by the piles
of dead Pandanus
the vegetation must
have been Pandanus
or Pandanus plus Phragmites.
A few small tufts of Miscanthus ~~[illegible]~~,
now mostly a wet
pasture of Panicum,
with patches of mixed
ferns, sedges, ~~and~~ young
Pandanus, Osbeckia,
~~etc.~~ Glochidion?, Eriocaulon, etc.
Water draining out
in ditches is dark brown

May 27 – Shira Mizu gawa,
~~heads of Nagura Gawa~~,
near head ~~[illegible]~~ of north branch of
Nagura ~~valley~~
~~[illegible]~~ in marsh on cleared peat
land, being drained. — 60 m.

37132 Paspalum longifolium Roxb. — Det. A. Chase (new to Ryukyu flora) — culms erect.
5 abundant locally

6 33 Hedyotis Oldenlandia corymbosa var. uniflora vel aff. — flowers white
abundant locally

2 34 Panicum paludosum Roxb. — Det. A. Chase — bluish green, erect.
abundant

1956 Ryukyu Is

37135 Eriocaulon miyagianum Koidz.
5 common locally

May 27 - Nagura Valley, ½ mi. n.e. of Nagura, 1.5 km. n. of in patch of dense forest around shrine

5 36 Macaranga tanarius (L.) M.-A.
occasional ~~in~~

5 37 Ficus septica Burm. f.
occasional

A. macrorrhiza Schott
3 38 Alocasia cucullata
abundant in undergrowth

Melicope awadan (Hatus.) Ohwi & Hatus.
5 39 ~~Evodia~~
common in second story

P. obovata (R. Br.) Baehni
2 40 Pouteria ~~glomerata~~
rare in second story

5 41 Ficus Konishii Hayata
one seen.

Bryonopsis laciniosa (L.) Naudi
42 ~~Melothria~~
common in edges of forest

---

10 m.
Urantu Dake
~~Bannadake~~

small tree, fruit bluish green, with soft bright green processes.

spreading tree, compound trunks, figs depressed globose, immature.

stem to 0.5 m. tall, 3-4 cm. thick; leaves glossy green, at a slight angle to petiole; spathe pale green ~~[illegible]~~ boat-shape with round bottom. odor faintly like durian.

small tree 6 m. tall buds white.

small tree, 6 m. tall; leaves pale beneath.

large spreading tree with complex trunk, fruits on larger branches

extensive vine, with disgusting odor when crushed, ~~fruit~~ flower greenish yellow; fruit immature, green with white stripes (red with white when ripe).

1956 Ryukyu Is.

37143 Ardisia sieboldii Miq.
5 ~~small~~ edge of forest
~~44~~

5 44 Diospyros maritima Bl.
edge of forest

same – cultivated field.
5 45 Oryza sativa L.
(dry land cultivation)

May 27 ~~[illegible]~~ Fu Saki
on chert cliffs exposed
to sea
2 46 Hedyotis Oldenlandia crassifolia A.DC. vel aff.
in crevices
2 47 Pouteria ~~glomerata~~
on top of cliff P. obovata (R. Br.) Baehni

---

small tree; flowers
pinkish white; even
large branches snapping
off very readily ~~at~~
on abscission planes.

ok small tree; flowers
cream white.

ok
A. Chase erect

5 m.

fleshy

low bush, under 1 m.
tall; leaves pale beneath.

1950 Ryukyu Is.

May 28 - 1.5 km. s.w. of Kabira

(19) (photo 950-45) Gulch bottom in forested area.

Mixed scrub 4-5 m tall, dense, forming a full canopy, tangled with vines, with ferns, Piper, Oplismenus, Alocasia, and many seedlings in under growth.

Main shrubs are Ardisia, Psychotria, Maesa, Arenga, Zanthoxylum. Evodia, Lasianthus, (Laurac), Boehmeria, Neolitsea

Vines - Flagellaria, Smilax Caesalpinia, Piper, Elaeagnus, Lasianthus

Larger Ficus Trees as emergents.

ISHIGAKI ISLAND.

(20) Steep slope of side ravine - still a scrub forest but with general height perhaps 6-8 m. and more larger trees, mostly Ficus.

Undergrowth so dense as to necessitate a machete. Vines are bad, especially Smilax, the basal parts of which are somewhat prickly.

(21) Pine woods on steep slope - few other trees mixed in. pines are 10-20 cm. diam. 10-15 m. tall. Thin Miscanthus with shrubs covers ground. Many large boulders.

1956 ~~[illegible]~~ Ryukyu Is.

May 28 1.5-1.7 km. east of Yoshihara, ~~north coast~~ east of Kabira-wan
(22) (Photo 549-61)

Low dense forest about 10 m. tall, full canopy, trees mostly small, trunks up to 20 cm. rarely banyans with complex trunks much larger. Ficus is the most abundant genus in canopy layer, but with some others.

Dense undergrowth with ferns, Psychotria, urticaceae, Lasianthus, Arenga, Diospyros, Ardisia, ~~Allophyllus~~ Alocasia,

Abundant vines Flagellaria, Aristolochia, Caesalpinia, Smilax, Piper, aroids.

Ground bare in denser parts, thinly covered by dead leaves. Piper vines, etc.

A few tall Cyathea one tall Livistona seen.

This is on a sand underlain by sandy limestone which comes to the surface frequently. The reaction of the sand is pH 7.5-8. The situation is a gently sloping terrace dissected by broad shallow ravines.

Some large old rotting stumps in thick forest.

Stumps in clearings 1-5 m. apart, mostly 2-3 m.

In clearings a rank second growth 1-3 m. tall or taller of Melia, Pipturus, Macaranga, Ficus, Rhus, Nephrolepis, etc. tangled with Cayratia, Vitis or Ampelopsis, Caesalpinia (small stipules), Clematis.

Clerodendrum, ~~Gmelina~~, Carica,

1956 Ryukyu Is.

May 28 – ~~[illegible]~~ beach west north west of YCAT compound, west northwest of Ishigaki City

The beach ridge, held in places by a low sea wall, is covered by a beach scrub, quite dense, composed of:

Scaevola sericea
Pandanus
Clerodendrum inerme
Hernandia sonora
Thespesia populnea
Hibiscus tiliaceus
Wedelia biflora

at the edges and in openings are

Vigna marina
Thuarea involuta
Ischaemum muticum
Digitaria sp.
Ipomoea pes-caprae

1956 Ryukyu Is.

May 28 - 1.5 km. s.w. of Kabira
0.5-~~[illegible]~~ km. s.e. of Mae Take
in dense low wet scrub
forest in ravine

37148 Ficus benguetensis Merr. ✓
5 common on steep slopes

Smilax

5 49 Neolitsea
occasional

5 50 ~~Boehmeria~~ Oreocnide pedunculata (Shirai)
~~common~~ occasional

2 51 ~~Evodia~~ Melicope accedens (Hatus.)
occasional

2 52 Ardisia ~~crenata~~
common A. sieboldii Miq.

3 53 Turpinia ternata Nakai
occasional

5 54 Thelypteris Cyclosorus parasiticus (L.) Farwell
common

5 55 Ehretia microphylla Lam.
Carmona retusa
~~[illegible]~~ occasional

5 56 Ardisia ~~crenata~~ A. quinquegona Bl.
common

5 57 Psychotria liukiuensis Hay.
very common in undergrowth

5 58 Lasianthus Lasianthus nigrocarpus (Masam.) Masam.
common in undergrowth

ISHIGAKI ISLAND.

40-60 m.

ok — small tree, fruits borne only in dense hemispherical clusters on the proximal few cm. of the roots or absolute base of stem, immature.

shrub 2-3 m. tall, fruit immature.

Masam. — shrub ~~[illegible]~~ 2 m. tall

Ohwi & Hatus. — shrub 2 m. tall

shrub 3 m. tall (others taller). flowers pinkish white.

shrub 3 m. tall; fruit immature.

rhizome creeping, fronds erect, arching at tips.

~~[illegible]~~ arching, semi-scrambling shrub 3 m. tall; fruit orange-red when ripe.

shrub 2.5 m. tall; fruit immature

shrub 1.5 m. tall, flowers greenish, stigmas and stamen-beards white.

shrub 1-1.5 m. tall; leaves glossy and prominently veined above.

1956 Ryukyu Is.

37159 Maesa tenera Mez
6 common

same – steep mountain side, in forest
5 60) ~~Chloranthus~~ Sarcandra glabra
rare

May 29 – 2~ 2.5 km. s.s.w. of Kabira
(24, 25) (Photo 950-65)
Dense stand of young pine with scattered older pines, some admixture locally of broad-leaf species.

(26) (Photo 950-65) ~~same~~ 2.5 km s.s.w. of Kabira
Ridges and slopes with scattered pines in thicket of broad-leaf species.

OK shrub 2 m. tall, fruit immature.

100 m.

(Thunb.) Nakai
OK shrub 1 m. tall, fruit green. Green wood with a very pleasant resinous odor when crushed.

May 29 – 1.8 km. s.w. of Kabira

(27) (Photo 950-65)
Grassy steep ridge. The grass is mainly Imperata, moderately dense, with scattered pine seedling, 3-5 dm. tall, rather abundant, and scattered low bushes of Eurya, Glochidion, Osbeckia,
Vaccinium and several other species.
Smilax Dianella, Evolvulus,
Rhododendron
Psidium Scleria, Lygodium, Rhynchospora rubra, Desmodium sp., ~~labiate~~ acanth., Blumea, Pteridium, Gleichenia, Thelypteris. Some invasion of Miscanthus. This ridge has evidently been burned a couple of years ago. Some charcoal in soil.

1956 Ryukyu Is.

Up the ridge pines become frequent. One about 25 cm. and 1 about 20 cm. were recently cut. Some others still standing are about 30 cm. dbh. Those cut were about 35-40 years and 25 years respectively judging by rather unsatisfactory ring counts.

Here the ground cover becomes predominantly Miscanthus, with some Imperata, some Ligularia and less numerous but larger shrubs.

Ridge from peak to next peak covered by a low gnarled, ridge-top scrub forest with habit of cloud forest but not mossy. Many genera represented, whole not more than 4-5 m. tall.

Viburnum
Myrsine
Psychotria
Raphiolepis?
Podocarpus
several Lauraceae

Vaccinium
Antiderma
Dendropanax
Quercus
Distylium

(23) Grassland with scattered pines, scattered small bushes — Psidium, ~~Osbeckia~~ Melastoma, Rosa.

Imperata, Sporobolus, Elephantopus mollis, Centella, Paspalum, Fimbristylis, Setaria, Lygodium, Cyperus,

Secondary thicket
perhaps 4 m. high,
of Pandanus, Glochidion,
a little Rhus(?) and Eurya
Ficus, Mallotus & several
sterile shrubs.
Undergrowth in thinner
spots of Thelypteris
gongylodes, Alpinia
speciosa, Scleria,
2 spp of Lygodium.

This is a wet low place.

May 29 - mouth of
Nagura-gawa
wet sand flats
covered by a pure
stand of Fimbristylis

May 29 - Beach southwest
of Nagura-gawa
sand ridge at top
of beach - covered by a
low scrub about 2-3
m. high of Scaevola,
Hibiscus, Pandanus,
Clerodendrum, Messerschmidia,
Morus, Miscanthus,
Premna,
Openings and a strip
at top of beach covered
by Ipomoea pes-caprae,
Vigna marina, Ischaemum,
Spinifex, Artemisia,
Thuarea, Wedelia,
Euphorbia, Zoysia(?)
Vitex, Imperata, Cirsium
Rosa.

1956 Ryukyu Is.

May 29 - coast 3 miles n.w. of Nagura, just s.e. of Mijuni ~~Saki~~

37161 5 Angelica ~~kiusiana Maxim.~~ ?
common along seashore on banks above ~~t~~ salt marsh

~~[illegible]~~ ~~[illegible]~~ May 29 - mouth of Nagura - Gawa

7 62 Fimbristylis ferruginea Vahl
pure stand on wet sand flat, inundated by tide.

May 29 - 2-2.3 km ~~[illegible]~~ ~~[illegible]~~ w.s.w. of Kabira, 0.6-0.7 km. s. of Mae Take
swampy thicket

11 63 Glochidion hongkongense M.-A.
~~scrubby tree 3-4 m. tall~~
co-dominant with Pandanus

6 64 Lygodium scandens var. microphyllum (R.Br.)
climbing in edge of

same
in edge of dense young pine woods

7 65 ~~(scrub)~~ Wendlandia formosana Cow.

(Breynia officinalis Hemsl.

2 66 (Phyllanthus
common

2 67 (~~Fraxinus~~
rare in trail

~~68~~ (Lindernia crustacea (L.) F. von Muell

(over)

Ishigaki

2 m. A. japonica A. Gray
scape 1.2 m. tall, leaves on fruiting plant dead, leaves of specimen from a sterile rosette nearby.

0 m.
caespitose

ok J.H. Kern

60 m.
scrubby tree 3-4 m. tall; flowers yellow.

Bonaparte
fronds twining, much branched, pinnules somewhat glaucous.

60 m.

ok
shrub 3 m. tall, flowers white

shrub 1.9 m. tall; fruit red.

same – in grassy meadow
with scattered pines

5 37168 Rhynchospora rubra (Lam.) Makino
common

1 69 Lilium longiflorum Thunb.
rare

same –
on steep grassy slope
with scattered bushes
and pine seedlings

1 70 Spathoglottis plicata Bl.
rare

1 71 Smilax china v. kuru Sakaguchi ex Yamamoto – det T. Koyama 1959
common

1 72 Blumea
rare

5 73 Dianella ensifolia (L.) DC.
common

7 74 Vaccinium wrightii A. Gray
rare

2 75 Glochidion obovatum S. & Z.
common

1 76 (~~[illegible]~~) Justicia procumbens var. riukiuensis Yamam.
occasional

same –
on steep grassy slope
among pines

77 Rhododendron [illegible] Nakai ?
common

(over)

---

70 m.

ok

ok erect, flower horizontal,
white, fragrant.

125 m.

flowers magenta-purple

tangled shrub 1 m. tall,
fruit immature

flowers deep slaty
blue, segments reflexed,
– fruit dark blue.
– shrub 0.7 m. tall;
fruit immature
– shrub 0.3–0.4 m. tall;
– flowers yellow.

det. [illegible] flowers pink

140 m.

shrub 1 m. tall

1954 Ryukyu Is.

same - in dwarfed
ridge-top forest

200 m.

37178 Daphniphyllum teijsmanni (var. okinawense Hurusawa?)
5 occasional
5 79 Viburnum japonicum (Thunb.) Spreng.
common
5 80 Myrsine seguinii Lév.
common
5 81

occasional
2 82 Viburnum japonicum (Thunb.) Spreng.
common, edge of forest
7 83 Vaccinium wrightii A. Gray
edge of forest
7 84 Itea formosana H.L.Li
rare
3 85(~~[illegible]~~) Cinnamomum doederleinii Engl.
common
1 86 Osmanthus bracteatus Matsum.
common
3 87 ~~Psychotria?~~ Tarenna
rare, edge of forest

small tree, fruit
immature
shrub 3 m. tall,
fruit immature.
small tree 4 m. tall,
fruit immature
shrub, fruit immature.

shrub 1 m. tall, fruit
immature
bush 2 m. tall
fruit immature.
small tree, 4 m. tall.

small tree, leaves
very glaucous beneath.
small tree, sterile.

shrub 1 m. tall
buds greenish, unopened,
(slightly contorted?)

1956 Ryukyu Is.

May 30 - head of north fork of Nagura Valley, mouth of gulch
(28) Secondary thicket
(Photo 950-17) 5 m. m. high, very dense, on ravine terrace. Schima, Trema, Cyathea,
Pandanus, Mallotus, Macaranga,
Lauraceae, etc. Stems slender, not of more than 8 cm. rarely to 15 cm.
Blechnum, Gleichenia forming loose undergrowth also another large fern.

Schima is most abundant.
(29) (Photo 950-12)
Soil a yellowish sand underlain by clay.

Up the valley between the two almost parallel forks of the stream, the thicket does not change much, perhaps gets taller, and species become much more numerous. The ground gets less sandy and more a mixture of reddish clay and rounded large boulders. After the ground rises sufficiently that

deep dissection becomes apparent Quercus becomes rather abundant and the secondary species tend to drop out.
Strangely enough, to this point, at least, Ficus is not common.

(29a) (Photo 950-14) Upstream the forest reaches a height of 10 m. is quite mixed in composition, with Quercus common. Trees mostly rather small

Bare looking spots in photo are patches of Dipteris, Gleichenia and a little Miscanthus on steep slopes.

May 30 – gulch of north ~~fork~~ fork of Nagura-Gawa above Dadifu 120–150 ~~[illegible]~~ m.
in dense low scrubby forest.

5	37188	Sphenomeris chinensis (L.) Maxon on wet rocks in gulch bottom		large dense clump, fronds arching, ascending
2	89	Ficus erecta Thunb. rare in wet gulch bottom		shrub, figs immature
2	90	Podocarpus nagi (Thunb.) Pilger rare ~~on~~ on wet gulch wall		sapling 1.5 m. tall, sterile (other seen 3 m. tall).
3	91	Callicarpa iriomotensis Masam. in wet gulch bottom	ok with Moldenke	
2	92	~~fern~~ Gymnosphaera podophylla (Hook.) Copel. common on wet gulch wall	det. C.V. Morton	distinct trunk 4 dm. high 4-5 cm. thick.
1	93	Ardisia ~~crenulata~~ sieboldii Miq. occasional on wet gulch wall		shrub 2 m. tall, flowers pinkish white.
1	94	Alpinia ~~sp.~~ ~~A.~~ chinensis (Willd.) Rosc.! rare on wet gulch wall		flowers white, lip with 2 pink stripes; rhizome with pepper odor, pleasant.
1	95	Ardisia sieboldii Miq. occasional in wet gulch bottom		shrub 2.5 m. tall, flowers pinkish white.
3	96	Psilotum nudum (L.) Griseb. epiphytic on tree trunk in wet gulch bottom, rare.	ok	
1	97	Ophiorrhiza inflata Maxim. on wet rocks in gulch bottom		
2	98	~~fern~~ Cyclosorus cuspidatus (Bl.) Copel. on wet rocks at bottom of deep gulch		
3	99	~~fern~~ Athyrium lanceum (Thunb.) Milde ~~Wagner, ined.~~ on wet rocks at bottom of deep gulch		fronds bent downward
	37200	~~fern~~ Prosaptia kanashiroi (Hayata) Nakai on wet rocks at bottom of waterfall in deep gulch		dark green

1956 Ryukyu Is.

37201 (rub.) Lasianthus plagiophyllus Hance
5 common on wet rocks
in bottom of deep gulch
1 02 (rub)
rare on wet rocks in
bottom of deep gulch
03 Eurya yaeyamensis Masam.
common in bottom
of wet gulch
6 04 ~~Styrax~~ Adinandra yaeyamensis Ohwi, ex char.
damp gulch bottom
1 05 Korthalsella opuntia (Thunb.) Merr.
damp gulch bottom,
parasitic on Styrax (37204)
1 06 (~~violet~~) Tashiroea yaeyamensis Matsum.
rare in damp gulch bottom
along stream
6 07 ~~Myrsine~~ Ternstroemia gymnanthera
rare in damp gulch
bottom
Dicranopteris linearis (Burm.) Underw
5 08 Gleichenia linearis ~~B~~
var. ferruginea
common in damp gulch
3 09 Saurauia tristyla var. oldhamii (Hemsl.) Fin.-Gagn.
rare in damp gulch
same, below Dadifu
3 10 Korthalsella opuntia (Thunb.) Merr.
rare in gulch bottom
7 11 Quercus cuspidata Thunb.
common on slopes
Castanopsis cuspidata (Thunb.) Schott.

ISHIGAKI ISLAND.

~~a~~ Low shrub; wood
foetid when crushed.

shrub 0.5 m. tall;
buds white.
small tree; leaves
convex; fruit immature.

100 m small tree, flowers
pinkish white
joints of branches flattened
in plane opposite that of
main ~~branch~~ stem.
shrub 0.5 m. tall,
flowers pink.

(W. & A.) Beddome small tree; fruit
immature.

forming tangles

small spreading
tree, flowers pink.

60–80 m branches flattened in
plane opposite that of
stem.
spreading tree 10 m.
fruit immature. tall, leaves with peculiar
bronze sheen beneath. I see no
reason for putting this in Castanopsis.

~~[illegible]~~ 1956 Ryukyu Is

37212 (~~rub.~~) Randia canthioides Champ.
1 rare on slopes
2 13 (~~rub.~~) Randia canthioides Champ.
rare on stream terrace
5 14 Elaeocarpus sylvestris var.
rare on stream terrace
2 15 (~~asclep.~~) Cynanchum liukiuense Warb.
rare on stream terrace
5 16 Ardisia quinquegona Bl.
occasional on stream terrace
~~4~~4 17 Psychotria liukiuensis
occasional in undergrowth on stream terrace
5 18
common on stream terrace

May 31 - 2.5 km. s.W. of Kabira

(30) (Photo 950-122)
Small hills, covered on north side with scattered pines in low secondary thicket, on south sides with Miscanthus, this also over the tops.

The thicket, of Mallotus, Ficus, Glochidion, lauraceae, ~~[illegible]~~ Macaranga, etc. with Smilax, Ampelopsis, Mussaenda, and other vines, and with

shrub 1 m. tall; fruit immature.
— shrub 2 m. tall.
ellipticus (Thunb.) Hara
small tree 5 m. tall, buds only.
— vine with milky sap, fruit green. flowers maroon.
— small tree 3 m. tall,

40 m shrub 1 m. tall, flowers pale greenish.

small tree 5 m. tall.

a tall lanky growth of Miscanthus wherever the canopy is a bit loose. Except where the canopy is very dense and at least 5 m. high this thicket is penetrated only with great labor. Ferns are numerous on the ground.

The Miscanthus on the summits and open slopes is about 3 m tall, very dense, can be pushed through but with great expenditure of energy

1956 Ryukyu Is

May 31 ~~3/4 mile~~ 1.2 km south of Kabira

(31) (Photo 950-65)
Small terrace, with loose Miscanthus a few pines, scattered shrubs of various sorts. Much Gleichenia and Pteridium Some Pandanus.

Across road a plantation of pines 10-15 cm dbh. & ~~??~~ 8-10 m. tall.
Open beneath with grass, ferns, Alocasia and low shrubs.

May 31 Futaka, ~~3/4 mile~~ 1.2 km. south of Kabira
~~in~~ thin growth of Miscanthus and scattered bushes on old terrace.

37219 4 Eurya japonica var.?
occasional ~~in~~

5 20 Itea formosana H. L. Li
occasional

7 21 Eurya emarginata (Thunb.) Makino!
occasional

6 22 Glochidion obovatum S. & Z.
~~occasio~~ common

8 23 Mussaenda yaeyamensis (Masam.) Masa
common in thicket
(over)

40 m.

shrub ~~??~~ 1.5 m. tall, fruit immature.
— shrub 2.5 m. tall, fruit dry.
— shrub 1.5 m. tall, leaves convex; fruit immature
— shrub 2 m. tall.

scandent shrub, enlarged calyx lobe white, caducous.

same - in undergrowth in pine plantation

5 37224 Pteris dispar Kunze P. semipinnata var. dispar (Kunze) Baker
common

1 25 Sarcandra glabra (Thunb.) Nakai
rare

5 26 Axonopus compressus (Sw.) Beauv.
common

1 27 Pteris cretica L. P. ryukyuensis Tagawa
rare

1 28 Pteris fauriei Hieron.

May 31 - ~~1½ mi.~~ 3 km. s.s.w. of Kabira, near Tsusutumu Mori
in undergrowth in second-growth thicket

2 29 (immat.) ? Oreocnide pedunculata (Shirai) Masam. ♂
occasional

2 30 ~~Rhaphidophora~~ Ophiorrhiza liukiuensis Hayata
rare ~~in~~

May 31 - 2.7 ~~miles~~ km. n.w. of Nagura along coast Shira Hama, e. of Kerasaki

5 31 Cladium chinense Nees
forming pure stand in marshy place

6 31a Rhynchospora corymbosa
in marshy place

---

20 m. tufted

subshrub 0.5 m. tall, filament fleshy, ~~enlarged~~ enlarged.

A. [illegible] culms spreading from center.

det. C.V. Morton

100 m.

weak shrub 1.5 m. tall.

subshrub 0.5 m. tall, flowers white.

2 m.

OK ascending culms ~~connected by~~ from prostrate rhizomes.

1956 Ryukyu Is.

June 1

(32) (Photo 940-101)
Small patch of swamp forest in broad wet spot where small stream issues from base of mountains.

(33) Sloping ridge between two deep ravines, of volcanic rock, basalt (?) below, breccia above.
Wooded but badly disturbed and logged out. Some fairly large trees 3-4 dm. dbh. but very crooked and not over 10-12 m. tall. Numerous species, incl. some of Ardisia, Camellia, Diospyros, Garcinia spicata, etc.
Shrub layer pronounced but not hard to walk through. Psychotria common. Vines, Smilax, etc. common at low altitude but dropping out above. Many ferns.

This forest is quite ragged looking with some secondary species such as Mallotus sp.
Almost no epiphytes except small liverworts mosses and lichens.
Rocks thinly mossy.

Ficus not abundant.

(34) (Photo 940-100)
Higher up on slopes just below Nosoko-Dake. Thicker woods, less disturbed, but much smaller trees, mostly less than 1 dm. dbh. a few large Ficus, etc. Some Quercus, Podocarpus. Canopy almost complete, about 10 m.

Undergrowth very low, less than 1 m. but luxuriant, with Sarcandra and Psychotria, many other shrubs, seedlings, many ferns creeping aroids, etc. Some Arenga. Quite wet.

(35) (Photo 940-100)
Base of steep rock face on north side of peak of Nosoko-Dake. Bare lava, shaded by trees, wet, with a few ferns and other herbs, including a yellow-flowered Lysimachia.

June 1 - northwest slopes of Nosoko-Dake.

in wet broad-leaf forest

37732 Tarenna ?
1 rare

1 33 Garcinia spicata Hook. f.
occasional ~~tree~~

(Lemmaphyllum microphyllum Presl
1 34 Pyrrosia
on large boulder

5 35 Psychotria serpens L.
rare, one colony seen on boulder

1 36 Alpinia chinensis (Willd.) Rosc.
rare

5 37 Lysimachia sikokiana Miq.
local on base of steep bare, smooth wet lava rock, shaded

3 38 Peperomia japonica Makino
rare on steep bare smooth wet lava rock, shaded

1 39 (orch.) Calanthe fauriei Schl.
rare, terrestrial

200-230 m.

shrub 1 m. tall; buds whitish.

straight tree 8 m. tall, lower branches sterile; flowers picked up from ground.

— forming loose mat.

or — creeping, branches; flowers white.

flowers white, lip with 2 pink stripes.

— flowers clear yellow.

~~te~~ stems ascending fleshy, leaves fleshy, pale beneath, dark green above

— flowers white.

June 1 - ridge northwest from Nozoko-Dake
in degraded moist forest

37240 Eurya
5 local

5 41 (rub) Lasianthus cyanocarpus Jack.
occasional

2 42 Camellia japonica var. hozanensis - (Hayata) Yamam. & Mori
occasional

5 43 (~~grass~~) Lophatherum gracile Brongn.
rare along trail on slope.

June 3 - Todoroki-gawa, 1.3 km. w.s.w. of mouth
Marsh on heavy fossiliferous clay. ~~Paspalum~~ most abundant. Eclipta, Wedelia, Polygonum, Ancilema Cyperus 3 spp., Potentilla, Hydrocotyle, etc.
Heavily grazed. Hummocky. Water channels between hummocks.

1.5 km. s.w. of mouth of Todoroki-gawa
Terrace of hard Ryukyu limestone underlain by an argillaceous fossiliferous limestone. Surface boulders look to be arranged by human agency. Collected fossils.

100 ~~80~~ - 150 small tree 5 m. tall; fruit immature
— shrub 1.5 m. tall; fruit fleshy, bright blue.
— tree 10 m. tall, 1 dm. dbh. dry fruit in tree.
[illegible] — caespitose, ~~tufts~~ panicles stiff; roots tuberously enlarged and clavate distally.

June 3 - Todoroki Gawa, 1.3 km. w. of mouth

Limestone cliff with fossil bearing "cave".
Covered by thicket of Melia, Ficus, Mallotus, Erythrina
Hibiscus tiliaceus, etc.
Undergrowth of Alocasia.
Araceous vines common.
Clerodendrum, Pandanus

1956 Ryukyu Is.

June 3 - 1.3 km. slightly south of west of mouth of Todoroki ~~g~~ gawa.
on roadside in cultivated land.

37244 Verbena officinalis L.
5 common

2 45 ~~Cat~~ Cardiospermum halicacabum var. microcarpum (H.B.K.) Bl.
rare

4 46 Hibiscus abelmoschus
occasional
Abelmoschus moschatus (L.) Medic.

same - in hummocky ~~in~~ marsh on heavy clay soil.

5 47 Cyperus elusinoides Kunth OK J.H. Kern
occasional to common

1 48 Wedelia chinensis (Osbeck) Merr.
rare ~~in~~.

1 49 Potentilla yokusaiana Makino
rare

1 50 Polygonum barbatum L.
occasional

1 51 Cyperus brevifolius Kyllinga brevifolia Rottb.
common

2 52 Cyperus globosus All.
occasional

7 53 Isachne globosa (Thunb.) Kuntze
abundant, forming hummocks

same - on bank of Todoroki-gawa

6 54 Sambucus
forming pure stand on river bank

ISHIGAKI ISLAND.

50 m.

flowers lavender

flowers white.

herb up to 1 m. long, ascending, flowers light yellow, stigmas dark maroon-black.

40 m.

single culms, erect, from rhizomes.

flowers yellow

petals yellow

flowers greenish white.

heads green.

AA A. Chase

40 m

shrub or giant herb 2 m. tall, panicle flat, flowers white.

1956 Ryukyu Is.

same - in water in edge of rice field

37 2 55 Marsilea quadrifolia L.
3 common

June 3 - Todoroki + Gawa, 1.3 km. W. of mouth thicket on and at base of low limestone cliff.

5 56 ~~Mallotus~~ ?no Alchornea trewioides M.A. (var formosana Pax!)
common in edges of

7 57 Capsicum frutescens L.
in undergrowth in

5 58 Ficus virgata Reinw.
common in

3 59 Vitis lanata Roxb.
climbing in

2 60 Clerodendrum trichotomum Thunb.
common in

June 3 - top of hill 1 km. ~~south~~ W.S.W. of Kara-dake

3? 61 Brachiaria villosa (Lam.) A. Camus
rare, with other grasses on open hill top

---

40 m.

rhizome creeping on mud, leaves floating.

50 m.

shrub 1 m. tall

shrub 1.5 m. tall, flowers

1k nodding, greenish white, stamens dull blue; ripe fruit scarlet.

small spreading tree, fruit ~~[illegible]~~ dark red.

vine, in bud only, leaves white beneath.

small tree, flowers white with pink stamens and red corolla tube, calyx pale green.

136 m.

[illegible]

caespitose, culms spreading at base, then ascending

1956 Ryukyu Is.

June 3 – Hill 2 km. south of Kara-dake

Hill of schist, with black soil.

Covered by grass, with a few shrubs of 2 species of Eurya and Osbeckia chinensis, with Dianella, on north side.

The grass is predominantly Imperata, with some admixture of two species of Andropogon, and Paspalum conjugatum and a few other species, some Miscanthus at the top. The Imperata is mostly rather luxuriant and dense, well over knee high in most places. Evidence of light grazing. Grazing pattern not apparent. On a hill nearby, fenced and with much stock, the grazing pattern is very clear.

ISHIGAKI ISLAND.

F. R. Fosberg
Collection book 44
begin with..
no. 36925

Malaya